

RG 104, 8KRA-104-84-051  
Box 2

Miscellaneous Correspondence  
Relating Primarily to Building  
Construction Alterations & Inspections,  
1935-1937.

14. Foundation Work - PENDING Denver Mint Job



RADIOGRAM

WASHINGTON, D. C.  
NOVEMBER 7, 1935  
4:45 P.M.

CONSTRUCTION ENGINEER  
DENVER MINT

YOUR WIRE 5TH. DENVER COLORADO MINT AUTHORITY WIRED  
OCTOBER 25TH COVERED ALL FOOTINGS NECESSARY TO BE LOWERED TO SECURE  
SATISFACTORY BEARINGS.

T. C. BROOKS

RECEIVED  
NOV. 7, 1935  
4:15 P.M.



# Signal Corps, United States Army

Received at

c3-9501 U. S. GOVERNMENT PRINTING OFFICE: 1926

25WVB WA 21 TRSY

19

WASHINGTON DC 445P NOV 7 1935

CONSTRUCTION ENGINEER OWENS

U S MINT DENVER COLO

YOUR WIRE FIFTH DENVER COLORADO MINT AUTHORITY WIRED OCTOBER TWENTY  
FIFTH COVERED ALL FOOTINGS NECESSARY BE LOWERED TO SECURE SATISFACTORY  
BEARING

T C BROOKS

345P

TELEPHONED 403PM--WA/ CF CLRK

CLASS OF SERVICE DESIRED	
DOMESTIC	CABLE
TELEGRAM	FULL RATE
DAY LETTER	DEFERRED
NIGHT MESSAGE	NIGHT LETTER
NIGHT LETTER	SHIP RADIOGRAM

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

# WESTERN UNION

R. B. WHITE  
PRESIDENT

NEWCOMB CARLTON  
CHAIRMAN OF THE BOARD

J. C. WILLEVER  
FIRST VICE-PRESIDENT

CHECK

ACCT'G INFMN.

TIME FILED

NOV 5 PM 12 09

Send the following message, subject to the terms on back hereof, which are hereby agreed to

Denver, Mint Addition,  
Denver, Colo.,  
Nov. 5 th- 1935

Supervising Engineer,  
Public Works Branch,  
Procurement Division,  
Federal Warehouse,  
Washington, D.C.

Please wire answer as to lowering footings  
E-One- -Two- and Ten- Stop.  
See my letter Oct. 26th.

Signed- *James D. Owens*  
James D. Owens,  
Construction Engineer

" Official Business"- Government rate-  
Collect- Procurement Division- Public Works Branch.



# ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

To guard against mistakes or delays, the sender of a message should order it repeated, that is, telegraphed back to the originating office for comparison. For this, one-half the unrepeatable message rate is charged in addition. Unless otherwise indicated on its face, this is an unrepeatable message and paid for as such, in consideration whereof it is agreed between the sender of the message and this company as follows:

1. The company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the unrepeatable message rate beyond the sum of five hundred dollars; nor for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the repeatable message rate beyond the sum of five thousand dollars, *unless specially valued*; nor in any case for delays arising from unavoidable interruption in the working of its lines; nor for errors in cipher or obscure messages.

2. In any event the company shall not be liable for damages for mistakes or delays in the transmission or delivery, or for the non-delivery, of any message, whether caused by the negligence of its servants or otherwise, beyond the sum of five thousand dollars, at which amount each message is deemed to be valued, unless a greater value is stated in writing by the sender thereof at the time the message is tendered for transmission, and unless the repeatable message rate is paid or agreed to be paid, and an additional charge equal to one-tenth of one percent of the amount by which such valuation shall exceed five thousand dollars.

3. The company is hereby made the agent of the sender, without liability, to forward this message over the lines of any other company when necessary to reach its destination.

4. Domestic messages and incoming cable messages will be delivered free within one-half mile of the company's office in towns of 5,000 population or less, and within one mile of such office in other cities or towns. Beyond these limits the company does not undertake to make delivery, but will, without liability, at the sender's request, as his agent and at his expense, endeavor to contract for him for such delivery at a reasonable price.

5. No responsibility attaches to this company concerning messages until the same are accepted at one of its transmitting offices; and if a message is sent to such office by one of the company's messengers, he acts for that purpose as the agent of the sender.

6. The company will not be liable for damages or statutory penalties in any case where the claim is not presented in writing within sixty days after the message is filed with the company for transmission.

7. It is agreed that in any action by the company to recover the tolls for any message or messages the prompt and correct transmission and delivery thereof shall be presumed, subject to rebuttal by competent evidence.

8. Special terms governing the transmission of messages according to their classes, as enumerated below, shall apply to messages in each of such respective classes in addition to all the foregoing terms.

9. No employee of the company is authorized to vary the foregoing.

## THE WESTERN UNION TELEGRAPH COMPANY

INCORPORATED

B. B. WHITE, PRESIDENT

## CLASSES OF SERVICE

### TELEGRAMS

A full-rate expedited service.

### NIGHT MESSAGES

Accepted up to 2:00 A.M. at reduced rates to be sent during the night and delivered not earlier than the morning of the ensuing business day.

Night Messages may at the option of the Telegraph Company be mailed at destination to the addressees, and the Company shall be deemed to have discharged its obligation in such cases with respect to delivery by mailing such night messages at destination, postage prepaid.

### DAY LETTERS

A deferred day service at rates lower than the standard telegram rates as follows: One and one-half times the standard night letter rate for the transmission of 50 words or less and one-fifth of the initial rates for each additional 10 words or less.

#### SPECIAL TERMS APPLYING TO DAY LETTERS:

In further consideration of the reduced rate for this special Day Letter service, the following special terms in addition to those enumerated above are hereby agreed to:

A. Day Letters may be forwarded by the Telegraph Company as a deferred service and the transmission and delivery of such Day Letters is, in all respects, subordinate to the priority of transmission and delivery of regular telegrams.

B. This Day Letter is received subject to the express understanding and agreement that the Company does not undertake that a Day Letter shall be delivered on the day of its date absolutely, and at all events; but that the Company's obligation in this respect is subject to the condition that there shall remain sufficient time for the transmission and delivery of such Day Letter on the day of its date during regular office hours, subject to the priority of the transmission of regular telegrams under the conditions named above.

### NIGHT LETTERS

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### FULL RATE CABLES

An expedited service throughout. Code language permitted.

### DEFERRED HALF-RATE CABLES

Half-rate messages are subject to being deferred in favor of full rate messages for not exceeding 24 hours. Must be written in plain language.

### CABLE NIGHT LETTERS

An overnight service for plain language communications, at one-third the full rate, or less. Minimum of 25 words charged for. Subject to delivery at the convenience of the Company within 24 hours.

### SHIP RADIOGRAMS

A service to and from ships at sea, in all parts of the world. Plain language or code language may be used.

R A D I O G R A M

WASHINGTON, D. C.  
NOVEMBER 5, 1935.

CONSTRUCTION ENGINEER  
% UNITED STATES MINT  
DENVER, COLORADO

YOUR LETTER OF THE 26TH LAST PARAGRAPH. SUBMIT CONTRACTORS  
PROPOSAL LENGTHEN COLUMN E-5 24" MEANS SHOP SPLICED.

T. G. BROOKS.

RECEIVED  
NOVEMBER 5, 1935  
4:05 P.M.



CLASS OF SERVICE DESIRED	
DOMESTIC	CABLE
TELEGRAM	FULL RATE
DAY LETTER	DEFERRED
NIGHT MESSAGE	NIGHT LETTER
NIGHT LETTER	SHIP RADIOGRAM

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CHAIRMAN OF THE BOARD

J. C. WILLEVER  
FIRST VICE-PRESIDENT

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ACCT'G INFMN.
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Nov. 5 th- 1935

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Public Works Branch,  
Procurement Division,  
Federal Warehouse,  
Washington, D.C.

Please wire answer as to lowering footings  
E-One- -Two- and Ten- Stop.  
See my letter Oct. 26th.

Signed- -----

James D. Owens,  
Construction Engineer

" Official Business"- Government rate-  
Collect- Procurement Division- Public Works Branch.



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**THE WESTERN UNION TELEGRAPH COMPANY**  
INCORPORATED  
B. B. WHITE, PRESIDENT

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TELEGRAM	FULL RATE
DAY LETTER	DEFERRED
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Denver, Colo.  
Oct. 26 th. 1935

PW- S

Supervising Engineer,  
Public Works Branch,  
Procurement Division,  
Federal Warehouse,  
Washington, D.C.

Sir:

In connection with the foundation work of the U.S. mint Addition, Denver, Colo. This is to advise that the excavation down to contract grade is about complete. That the materials and status uncovered appear to conform very closely with Eng. Culberson's report.

However, in the N.W. corner, under piers E-12- E-13 and under the inside row of Cols. running East along E-14 -E-5 -E19- there appears a layer of clay 2-0 to 2-3" thick that is not suitable for bearing up to 5,000 lbs. to the square foot.

This material appears to be composed of a very fine sand, silt and an abnormal amount of mica sand with sufficient binder to hold it together when moist but readily dissolves when placed in water.

Nine test holes have been put down and in six of the holes the clay strata was encountered at about Elev. -Plus- 44-0 and usually was 2 to 2-3" thick. In two places underlaid by 8" of a very fine gray sand and then on down on coarse sand and gravel.

In the So.East corner under piers E-1 and E-2 the clay formation appeared 5-7" deep. However, these footing are higher up and we have a good coarse sand and gravel layer of 3-3" deep over the clay.

Herewith are copies of the 9- test hole reports also plot and transverse sections indicating the conditions as determined from our explorations.

Due to the designed load on the piers and the vibration that will be set up in the addition from the rolls and punching machines, I recommend that piers E-11- E-12 - E13- 14- E5 -E-19 and E-6 & E-7 be



----- Page two-----

J.D.Owens to Supervising Eng. Oct. 26th.  
U.S. Mint Foundation, Denver Colo.

lowered to elevation -plus 41-0 and all other piers effected by lowering to be adjusted to the proper levels.

The matter of lowering piers E-1-~~4~~ E-2 and E-10 will be held at contract grade pending your further instructions.

The entire area below elevation 41-0 with the exception of the S.E. east corner appears perfectly good for bearing up to 6,000 to Sq.ft.

Having the mat steel and 8 cars of structural on hand the contractor is very anxious proceed with his work or lower, so this information is presented to you for your study and further instructions by night letter, if possible, as to the elevations to reach, the size of the pedestal and to footings affected by lowering.

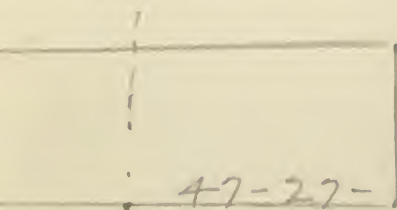
There appears a discrepancy between the contract drawing 1-400 and the approved shop drawing for the elevation of pier E-5. The contract drawing calls for 2-0" down, while the shop drawing requires only 8" to the top of the pier. Please advise which is correct.

Respectfully,

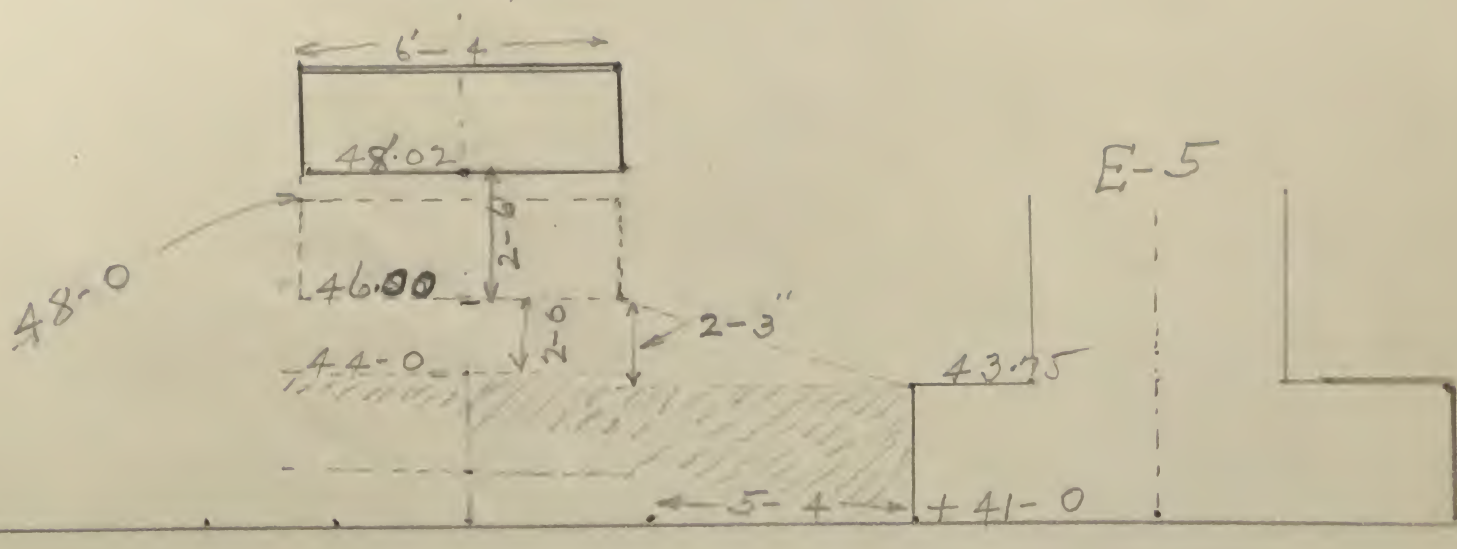
James D. Owens,

-----  
Construction Engineer.

E-4



E-19-



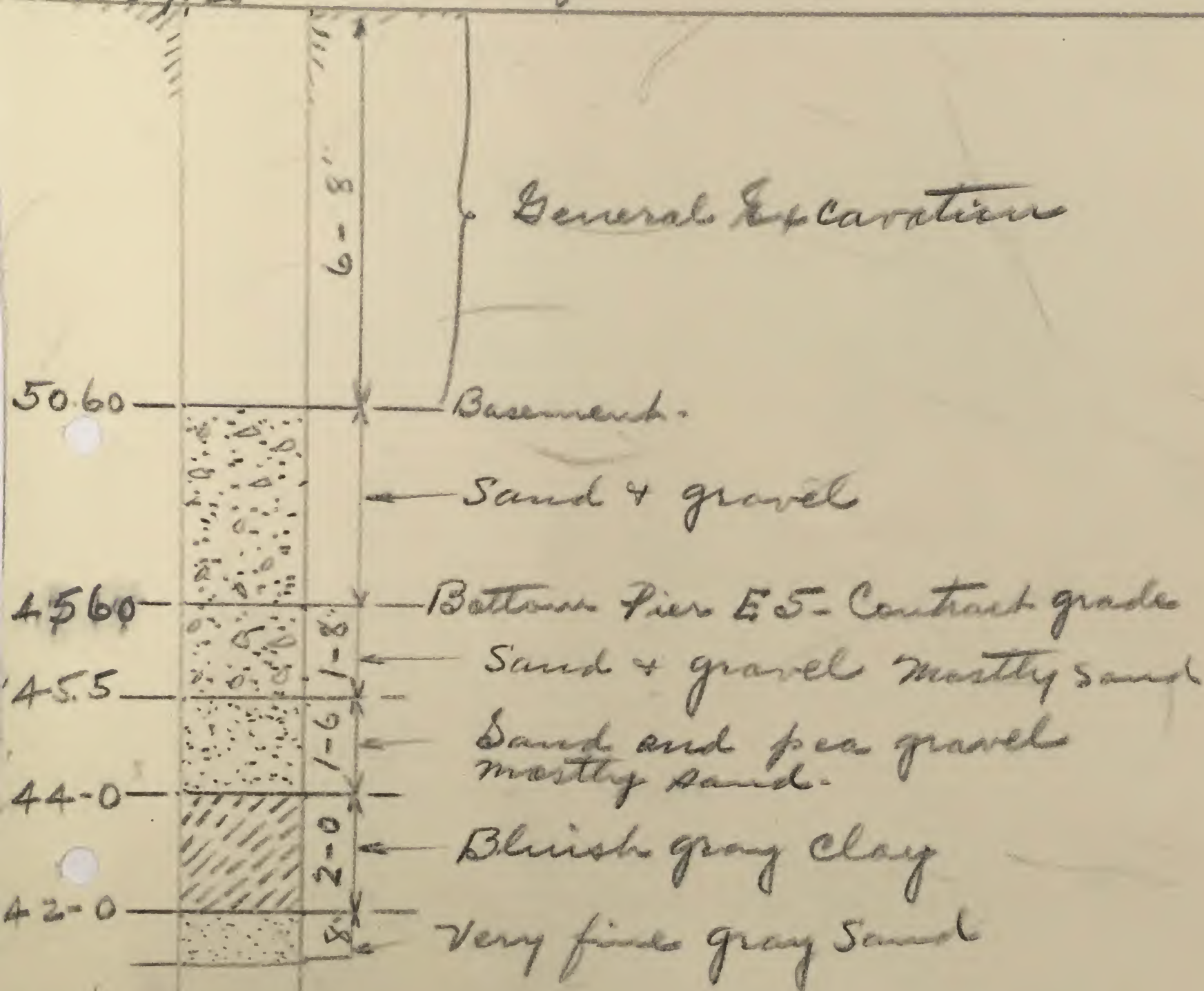
E-5



Test Hole No 3 - U.S. Mint, Denver, Colo.

Location - center of Pier E 5 -

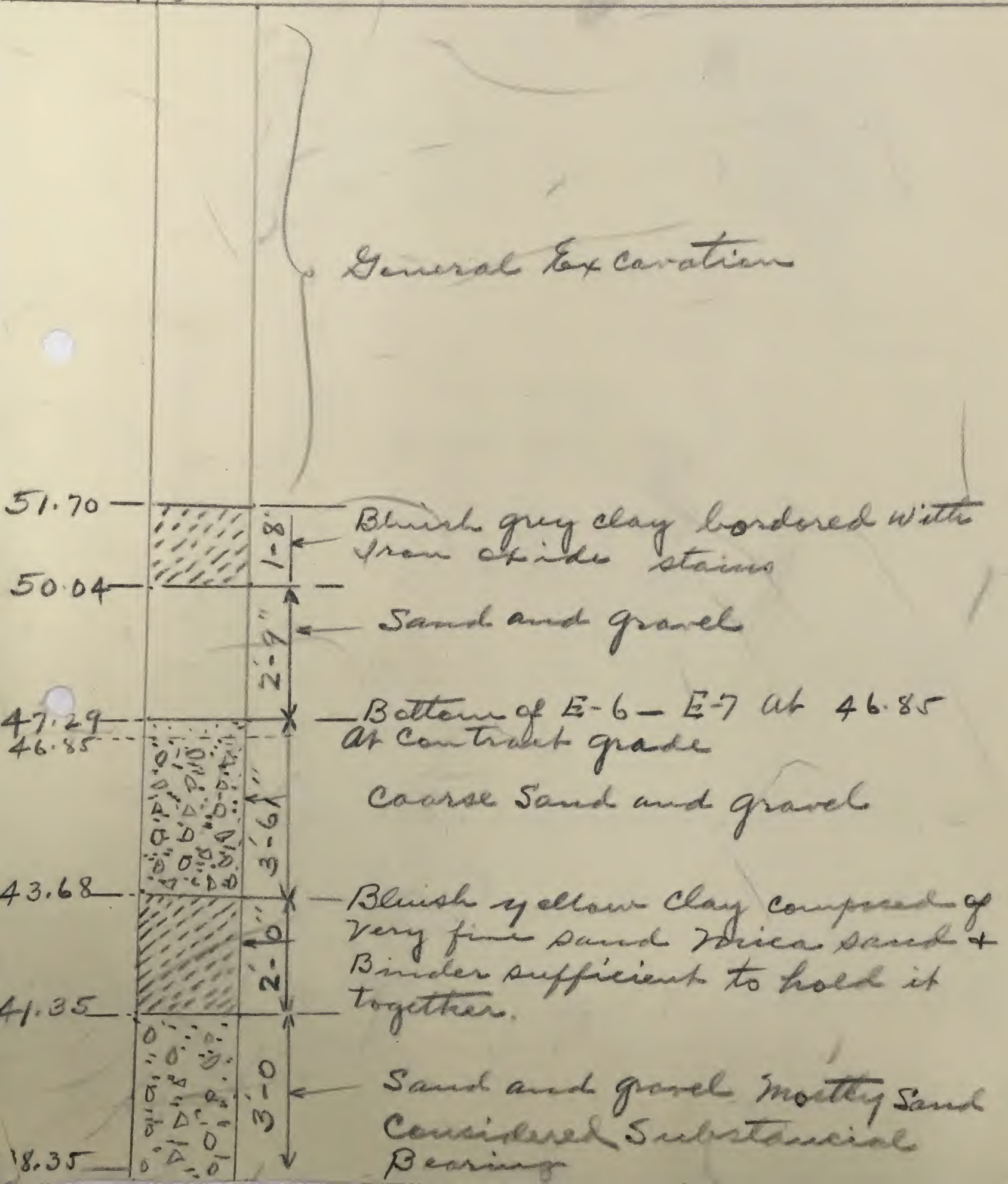
Elev - 57.25





Test Hole No 4 - Located midway  
between piers - E 6 - & 7 - U.S. Mint  
Addition, Denver Colo.

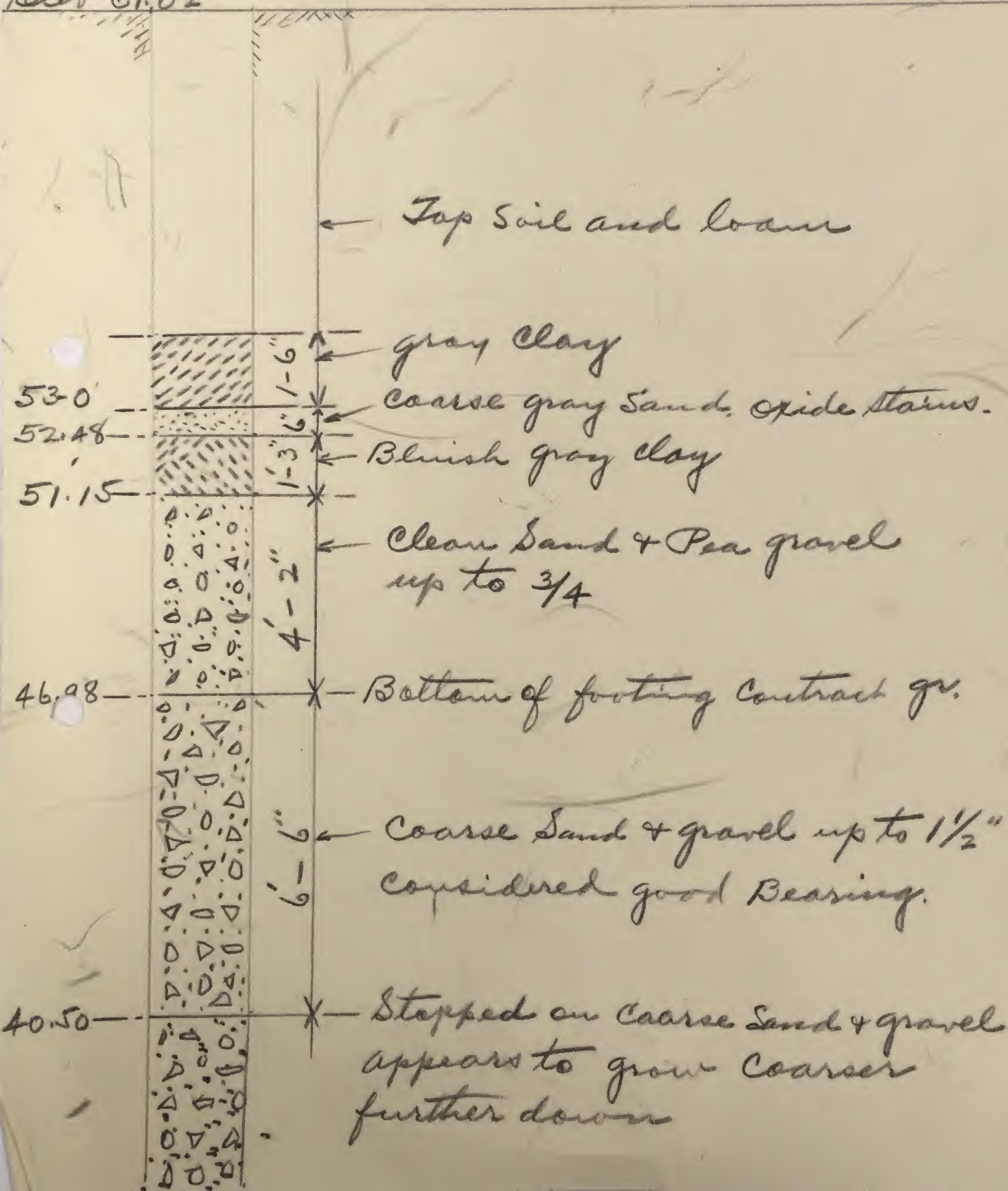
Elev 61'-0





Test Hole # 5- Inlet Addition  
Placed center Pier # E-3-

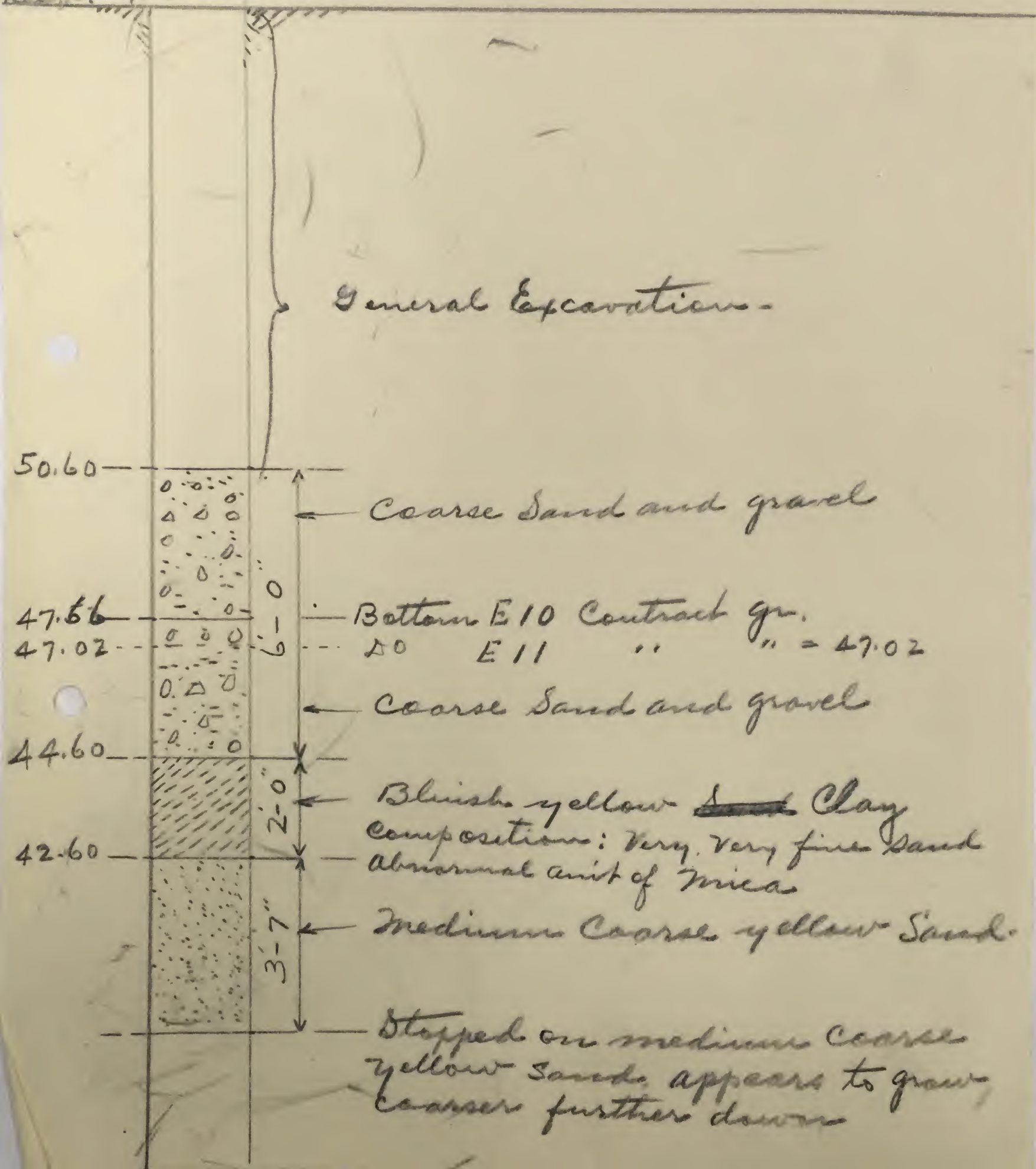
Elev 61.02





Test Hole #6 - U.S. Mint, Denver Colo.  
Location of hole midway between 10 & 11

Recess 61.0



Test Hole # 7 - U.S. Mint Addition  
Denver Colo.

Location of Hole Midway between  
Piers E 8 + 9 -

Elev 61-0

General Excavation

50.25

46.97

Bottom E-8 + 9 - Contract grade  
Coarse Sand and gravel

No Signs of Clay between  
42 + 44 as found elsewhere

42.75

Medium fine yellow Sand  
Small amt pea gravel

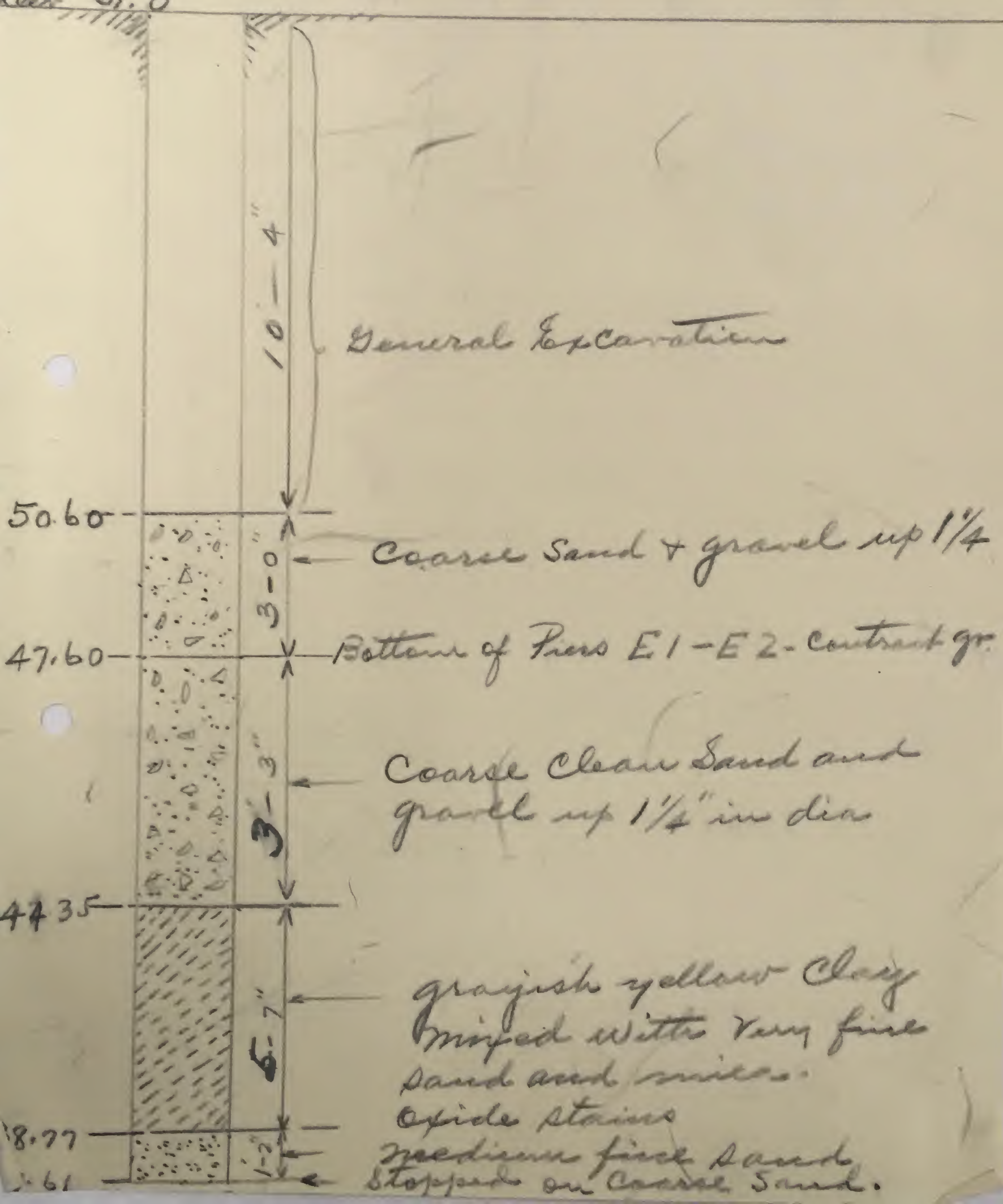
40.68

Stopped clear yellow Sand



Test Hole # 8 - U.S. Mint, Denver Colo.

Location - 2.6" S.E. from S.E. Corner Pier E 2  
Elev 61.0'





Test hole No-9- Mint Addition  
Hole located center Denver, Colo-  
pier E-4.

Elev 57.15

Formation about the same  
as test hole # 5 under pier  
E-3-

Bluish gray Clay.

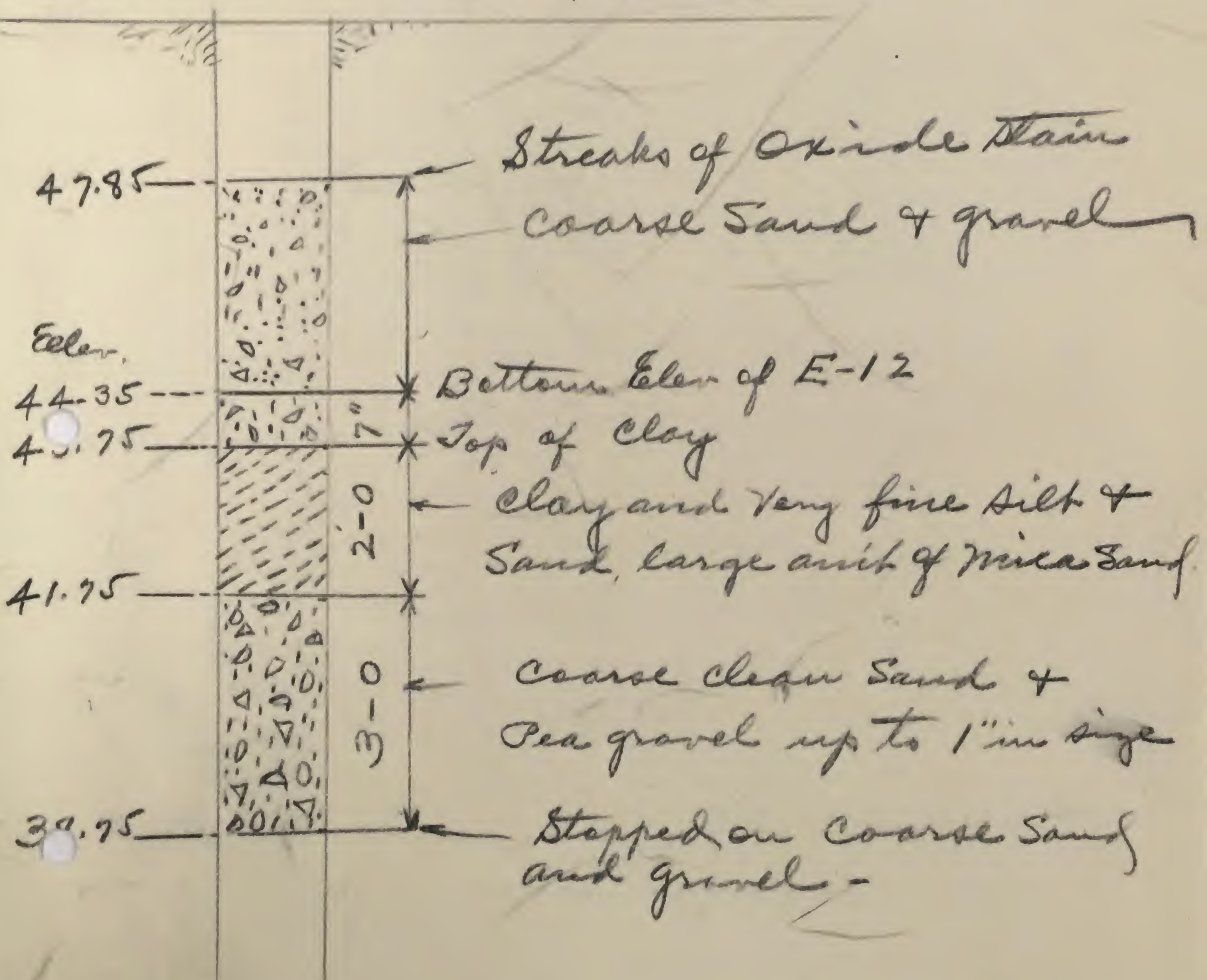
Coarse Sand and pea  
gravel up to  $\frac{3}{4}$  in dia.

Bottom of E-4 Contract grade

Stopped on Coarse Sand and  
pea gravel



Test Hole under footing E 12 -  
 Footing E 12 - Test Hole in Center  
 Contract Elevation 44-35.



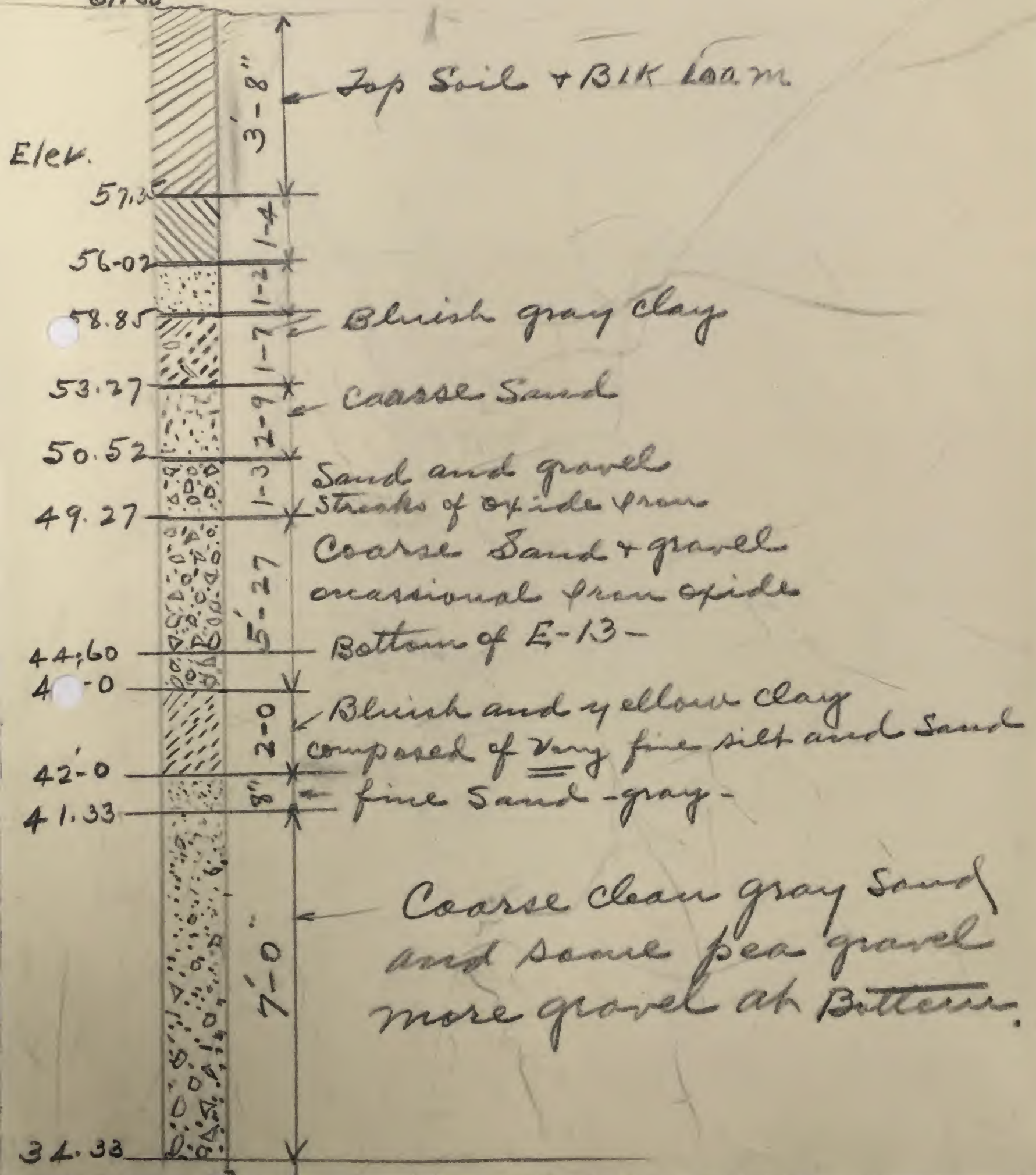


# Test Holes - Mint Foundation Area

Footings E13 -

Test Hole No 1

61.60



DENVER, COLO. DIST.

Procurement Division, Public Works Branch

"GENERAL EXPIRES."

PR-21-5

November 5, 1935.

Construction Engineer Corps,  
U. S. Dist,  
Denver, Colorado.

Denver Colorado Dist your letter twenty-sixth last paragraph submit  
contractors proposal lengthen column E five twentyfour inches means  
shop copies.

Superintendent of  
Structural Engineering.

Confirmation mailed

c.c. Distr.Engr.  
c.c. SE-PM



DENVER, COLO. MINT.

Procurement Division, Public Works Branch

"GENERAL EXPENSES."

PM-BA-S

November 5, 1935.

Construction Engineer Owens,  
U.S. Mint,  
Denver, Colo.

Photograph reinforcing steel yours first extension Denver Colorado Mint  
generally satisfactory(stop)Permit contractor pour concrete when steel  
meets your full approval.

Superintendent of  
Structural Engineering.

Confirmation mailed

c.c. Distr.Engr.  
c.c. Constr.Engr.  
c.c. SE-PM

# Signal Corps, United States Army

Received at

c3-9501 U. S. GOVERNMENT PRINTING OFFICE: 1929

22WVB B 23TRSY 1EX NL

19

WASHN DC

449P NOV 5

CONSTRUCTION ENGR

OWENS U S MINT DENVER

DENVER COLORADO MINT YOUR LETTER TWENTY SIXTH LAST PARAGRAPH

SUBMIT CONTRACTORS PROPOSAL LENGTHEN COLUMN E FIVE TWENTY FOUR

CHES MEANS SHOP SPLICE

T C BROOKS

347P

*Hand 352*

DENVER, COLORADO, MINT.

Procurement Division, Pub. Wks. Br.

"GENERAL EXPENSES"

PN - SA'S

November 7, 1935.

Construction Engineer Owens,  
U. S. Mint,  
Denver, Colorado.

Your wire fifth Denver Colorado Mint authority wired October twentyfifth covered all footings necessary be lowered to secure satisfactory bearing.

Supt. Structural Engineering.

Copy to Distr. Engr.

Confirmation mailed:



Radio Gram -

12.35 P.

Nov - 5 - 35

Owen -

Photo R - my Steel yours 1st  
Ent print - Gen - Satisfactory

Permit's Contract Pour Concrete  
when steel  
meets your approval -

Signed  
J. C. Brooks

# Bottom Elevations

$$E-1 = +47.50$$

$$2 = 47.02$$

$$3 = 47.02$$

$$4 = 47.27$$

$$5 = 45.52$$

$$6 = 47.27$$

$$7 = 46.98$$

$$8 = 47.02$$

$$9 = 47.02$$

$$10 = 47.50$$

$$11 = 47.02$$

$$12 = 47.02$$

$$13 = 44.60 -$$

$$14 = 46.33 -$$

$$15 = 48.27$$

$$16 = 48.02$$

$$17 = 48.02$$

$$18 = 48.27$$

$$19 = 48.02$$

# Signal Corps, United States Army

Received at

c3-9501 U. S. GOVERNMENT PRINTING OFFICE: 1928

18WVB WA 54 TRSY

19

WASHINGTON DC 357P OCT 25 1935

CONSTRUCTION ENGINEER OWENS

US MINT DENVER COLO

YOU AUTHORIZED HAVE CONTRACTOR PROCEED LOWER FOOTINGS AS NECESSARY TO  
REACH SUITABLE MATERIAL AT COST PLUS TEN AND TEN TOTAL  
NOT TO EXCEED ESTIMATE ONE THOUSAND DOLLARS AS ADDITION HIS  
CONTRACT PERIOD FOOTINGS TO REMAIN AS DESIGNATED AND INCREASED HEIGHT  
EFFECTED BY PEDESTALS HAVING DIMENSIONS ONE FOOT GREATER EACH WAY  
THAN STEEL FILLET SUPPORT

W E REYNOLDS

418P

TELEPHONED 832AM, 26TH--WA/



Denver, Colo.  
Oct. 26 th. 1935

PW- S

Supervising Engineer,  
Public Works Branch,  
Procurement Division,  
Federal Warehouse,  
Washington, D.C.

Sir:

In connection with the foundation work of the U.S. mint Addition, Denver, Colo. This is to advise that the excavation down to contract grade is about complete. That the materials and strata uncovered appear to conform very closely with Eng. Culberson's report.

However, in the N.W. corner, under piers E-12- E-13 and under the inside row of Cols. running East along E-14 -E-5 -E-19- there appears a layer of clay 2-0 to 2-3" thick that is not suitable for bearing up to 5,000 lbs. to the square foot.

This material appears to be composed of a very fine sand, silt and an abnormal amount of mica sand with sufficient binder to hold it together when moist but readily dissolves when placed in water.

Nine test holes have been put down and in six of the holes the clay strata was encountered at about Elev. -Plus- 44-0 and usually was 2 to 2-3" thick. In two places underlaid by 8" of a very fine gray sand and then on down on coarse sand and gravel.

In the So.East corner under piers E-1 and E-2 the clay formation appeared 5-7" deep. Now ever, these footing are higher up and we have a good coarse sand and gravel layer of 3-3" deep over the clay.

Herewith are copies of the 9- test hole reports also plot and transverse sections indicating the conditions as determined from our explorations.

Due to the designed load on the piers and the vibration that will be set up in the addition from the rolls and punching machines, I recommend that piers E-11- E-12 - E-13- 14- E-5 -E-19 and E-6 & E-7 be



----- Page two-----

J.D.Owens to Supervising Eng. Oct. 26th.  
U.S. Mint Foundation, Denver Colo.

lowered to elevation -plus 41-0 and all other piers effected by lowering to be adjusted to the proper levels.

The matter of lowering piers E-1-~~#1~~ E-2 and E-10 will be held at contract grade pending your further instructions.

The entire area below elevation 41-0 with the exception of the S.E. east corner appears perfectly good for bearing up to 6,000 to Sq.ft.

Having the mat steel and 8 cars of structural on hand the contractor is very anxious proceed with his work or lower, so this information is presented to you for your study and further instructions by night letter, if possible, as to the elevations to reach, the size of the pedestal and to footings affected by lowering.

There appears a discrepancy between the contract drawing 1-400 and the approved shop drawing for the elevation of pier E-5. The contract drawing calls for 2-0" down, while the shop drawing requires only 8" to the top of the pier. Please advise which is correct.

Respectfully,

James D. Owens,

-----  
Construction Engineer.

# Lower footings - - -

E-12 - Cent gr. Lower	To Elev.
44.35 - + <sup>3.35</sup> 2.85 -	41.00
E 13 - 44.60 - 3.60 -	41.00
<del>14 - 46.33 - 5.33 -</del>	<del>41.00</del>
5 - 45.52 - 4.52 -	41.00
6 - 47.33 - 6.33 -	41.00
7 - 46.98 - 5.98 -	41.00

Footings effected;  
adjacent footings -  
Tap

E 4 - 47.27	} about $\frac{1}{4}$ of above
19 - 48.02 -	
18 - 48.27	
17 - 48.02	
16 - 48.02	
15 - 48.27	
14 - 46.33 -	
11 - 47.02 - -	13 -

44.0' E 12 - 3.35  
top.

$$\begin{array}{r} 44.35 \\ 41.00 \\ \hline 3.35 \end{array}$$



## Area of footings -

$$E-12 - 9 \times 9 \times 3-0 = 243. \text{cu ft} -$$

$$13 - 9-9 \times 9-9 \times 3.60 = 338.65$$

$$5 - 10-8" \times 10-8 \times 4.52 = 51.2.50$$

$$6 - 11-0 \times 11-0 \times 6.33 = 835.50$$

$$7 - 12-4" \times 12-4 \times 6.00 = 900.00$$

$$\begin{array}{r} 27 \overline{) 2829.65} \\ \underline{127. \text{cu yds}} \end{array}$$

Mass Concrete -  
Footings effected

E 4 -

19

18

17

16

15

14

11

$$\text{estimated} = 32.00$$

$$\text{mass concrete} - 159.00 \text{ cu yds}$$

$$@ \underline{8.00}$$

$$1272.00$$

$$\text{add Forms} - 75.00$$

$$\text{add Excavation} 60.00$$

$$\text{Placing Concrete}$$

$$@ \$10 \text{ per yd} - 160.00$$

$$\$1567.00$$

$$\text{Plus 10\% over} 156.70$$

$$1723.70$$

$$\text{Plus 10\% prof}$$

$$1723.70$$

$$\underline{\$1996.05}$$

~~A.A.6.7.6  
A.A.6.0.4~~



Lower Frostings to Elev.  
 Contrast grade - Lower -

E12	(44.35) 47.02 =	3.35	41.00
13 -	44.60 - -	3.60	41.00'
14 -	46.33 - -	5.33	41.0'
5 -	45.52 - -	4.52	41.0'
19 -	48.02 - -	7.02	41.0'
6 -	47.33 - -	6.33	41.0
7 -	46.98 - -	5.98	41.0
4 -	47.27 - -	6.27	41.00

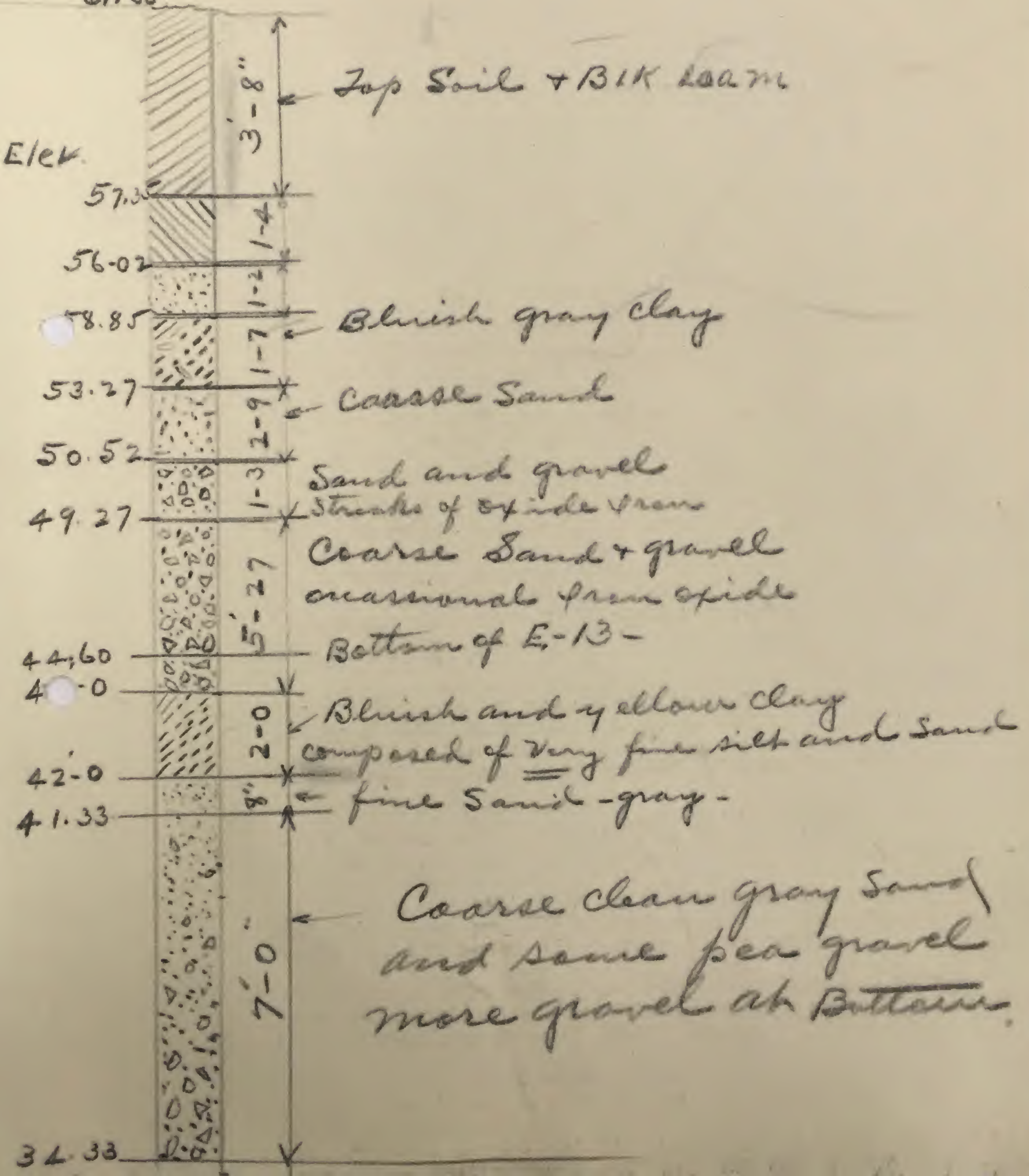
Down to Clay -

4-12 -	47.02 - -	3' - 27"	
13	44.50 - -	66" - or 8" in Clay	
14	46.33 - -	2' - 33"	
5	45.52 - -	1.52	
19 -	48.02 - H -	4 - 02	
6 -	47.33 - -	3.65	
7	46.98 - -	3.80 -	
4 -	47.27 - -	3.27	
3 -	47.02 -	Coarse Sand (H) + 43.0	



# Test Holes - over Hammer

Footings E/3 -  
Test Hole No 1  
61.60

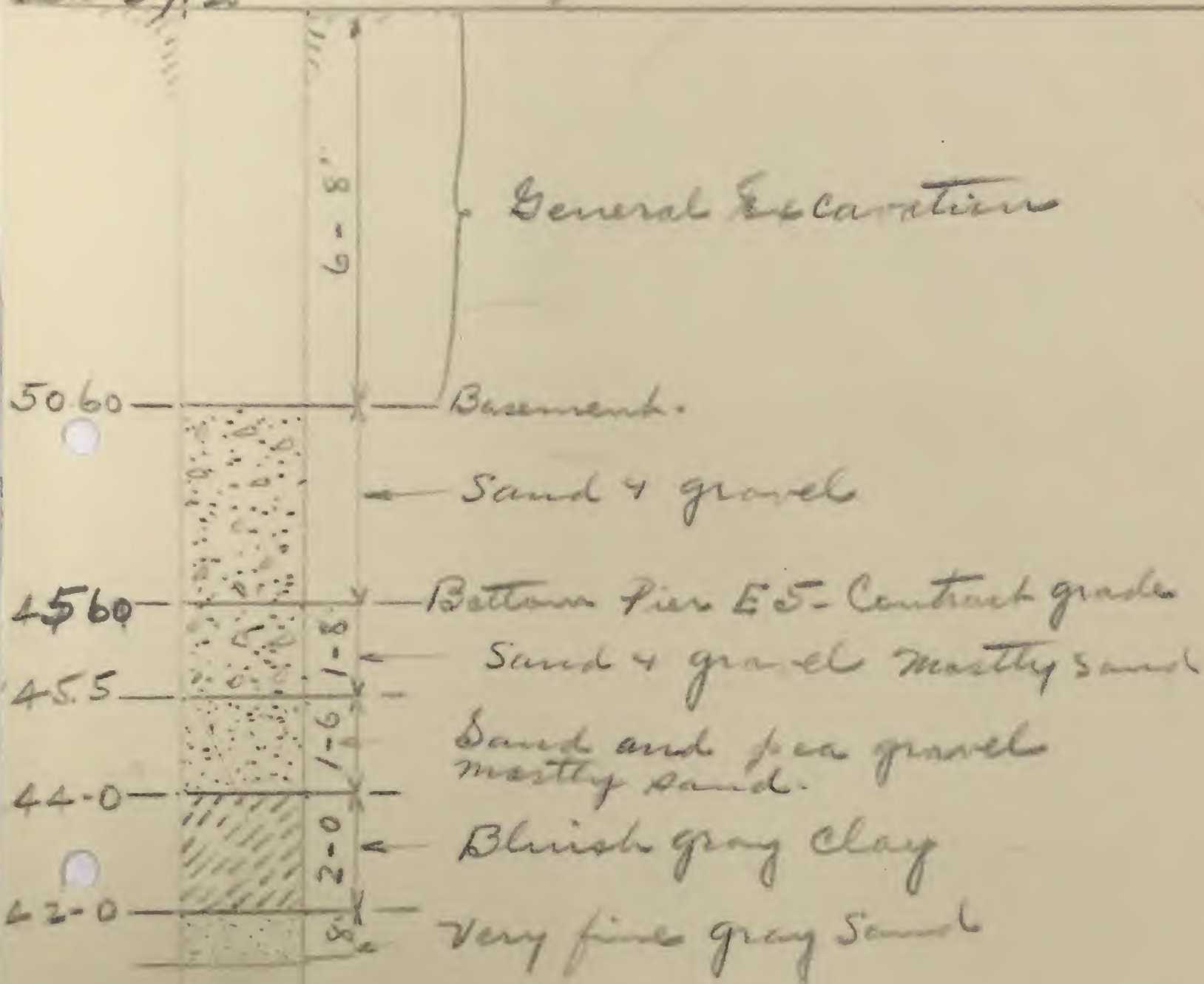




Test Hole No 3 - U.S. Mint, Denver, Colo.

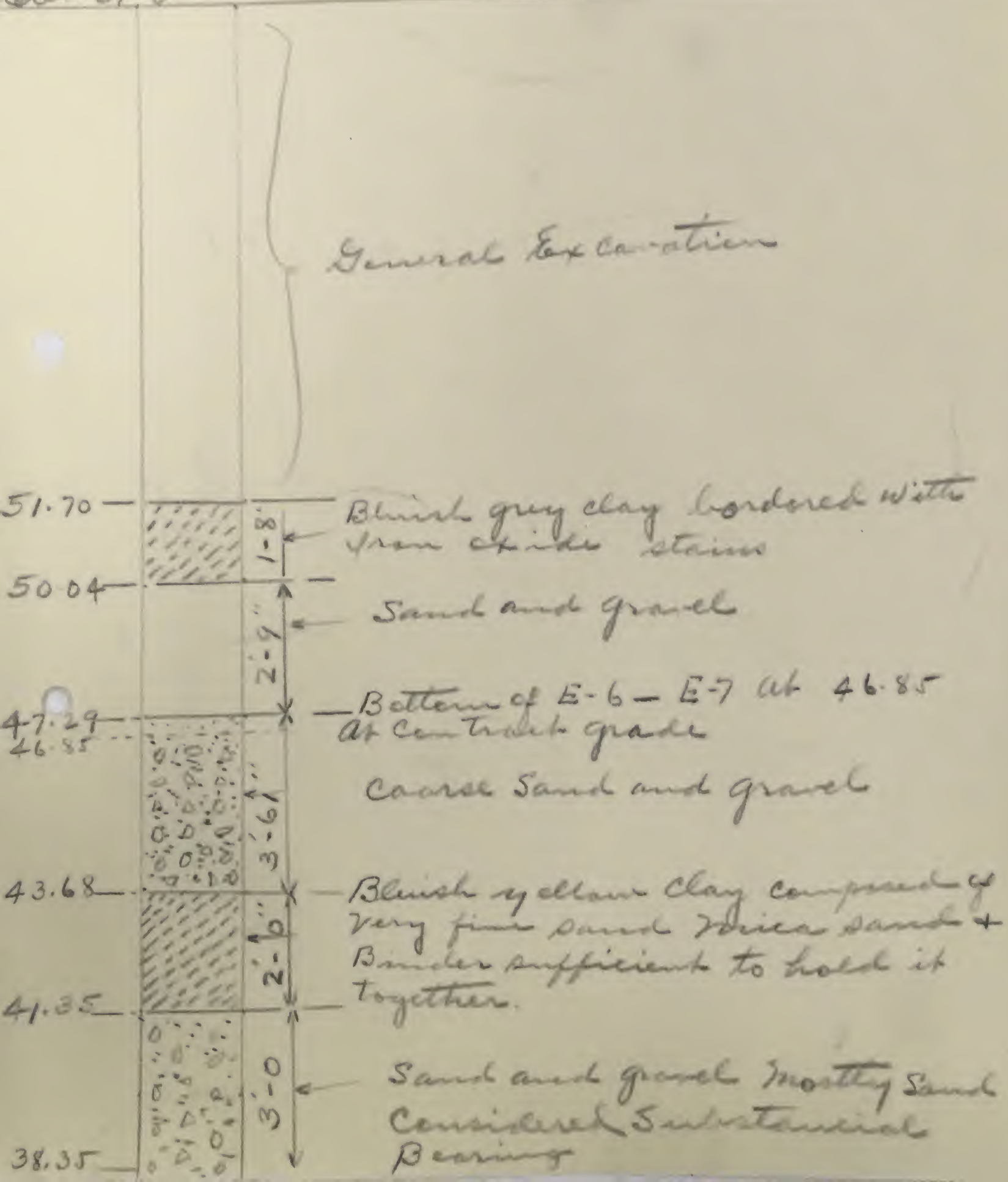
Location - center of Pier E 5 -

Elev 57.25



Test Hole No 4 - Located midway  
between piers - E 6 - & 7 - U.S. Mint  
Addition. Denver Colo.

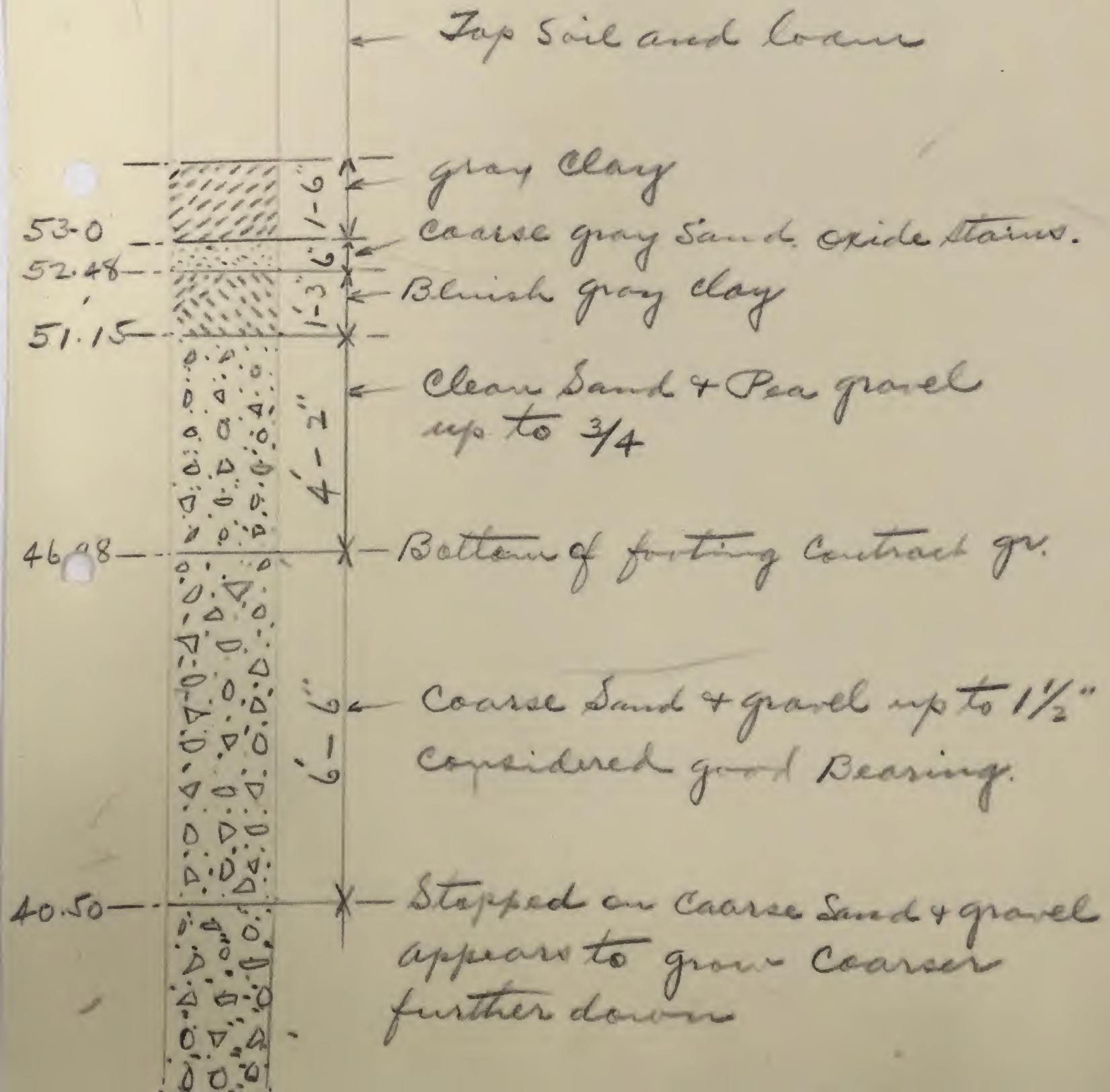
Elev. 61'-0





Test Hole # 5- Inlet Addition  
Placed center Pier # E-3-

Elev 61.02



Test Hole # 6 - U S Mint, Denver Colo.  
Location of hole midway between 104+11

Elev. 61.0

General Excavation.

50.60

Coarse Sand and gravel

47.66

Bottom E 10 Contract gr.

47.02

DO E 11 " " = 47.02

Coarse Sand and gravel

44.60

Bluish yellow ~~Sand~~ Clay

42.60

Composition: Very very fine Sand  
Abnormal amt of mica

Medium Coarse yellow Sand.

Stopped on medium Coarse  
yellow Sand. appears to grow  
coarser further down



Test Hole # 7 - U S Mint Addition  
Denver Colo.

Location of Hole Midway between  
Piers E 8 + 9 -

Elev 61.0

General Excavation

50.25

46.97

42.75

40.68

Bottom E-8+9. Contract grade  
Coarse Sand and gravel

No Signs of Clay between  
42.75 & 44.00 as found elsewhere

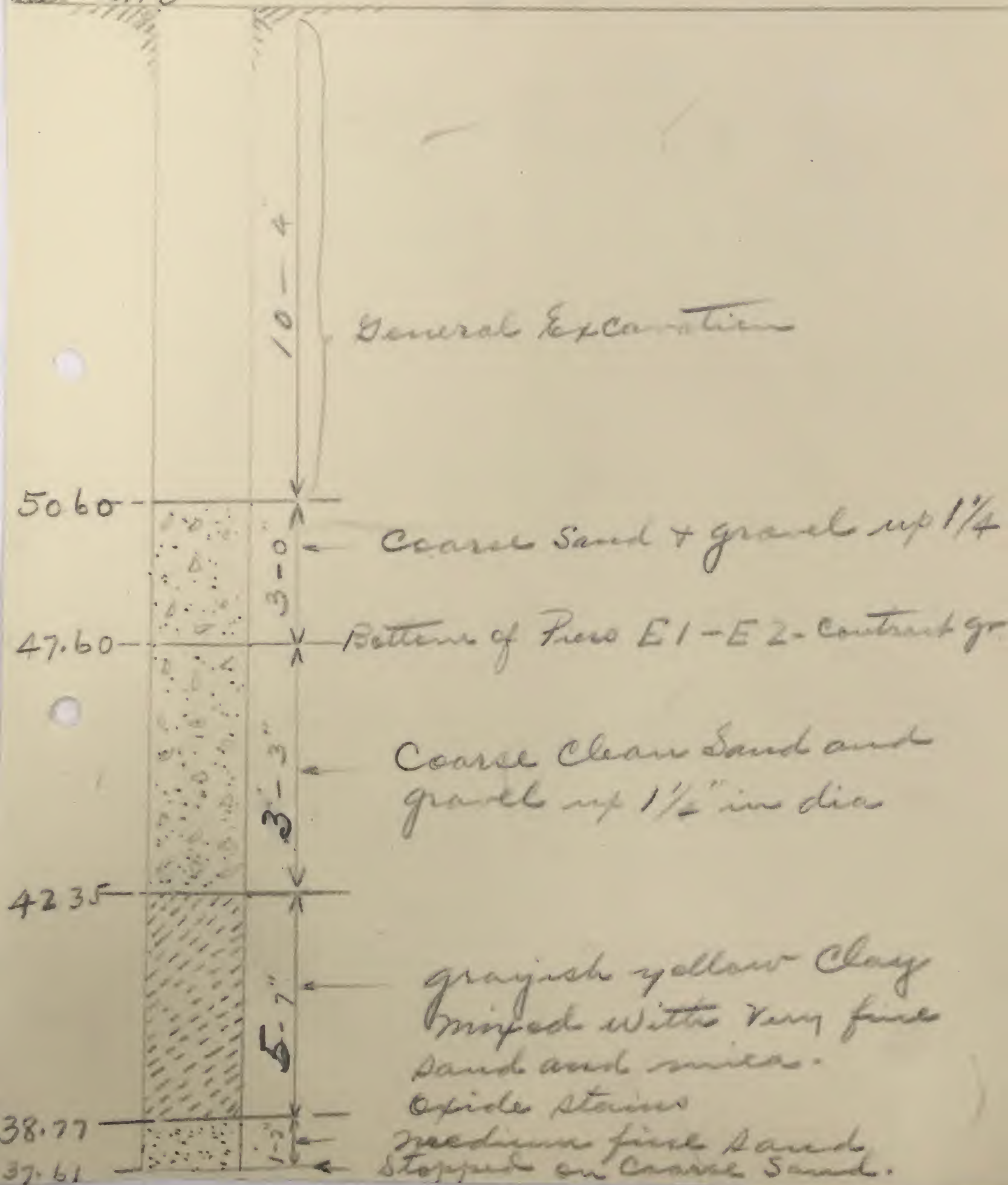
Medium fine yellow Sand  
Small amt pea gravel

Stopped clear yellow Sand

Test Hole # 8- U.S. Mint, Denver Colo.

Location - 2.6" S.E. from S.E. Corner Pier E 2

Elev 61.0'





Test hole No-9- Ninth Addition  
Hole located center Denver, Colo-  
pier E-4.

Elev-57.15.

Formation about the same  
as test hole # 5 under pier  
E-3-

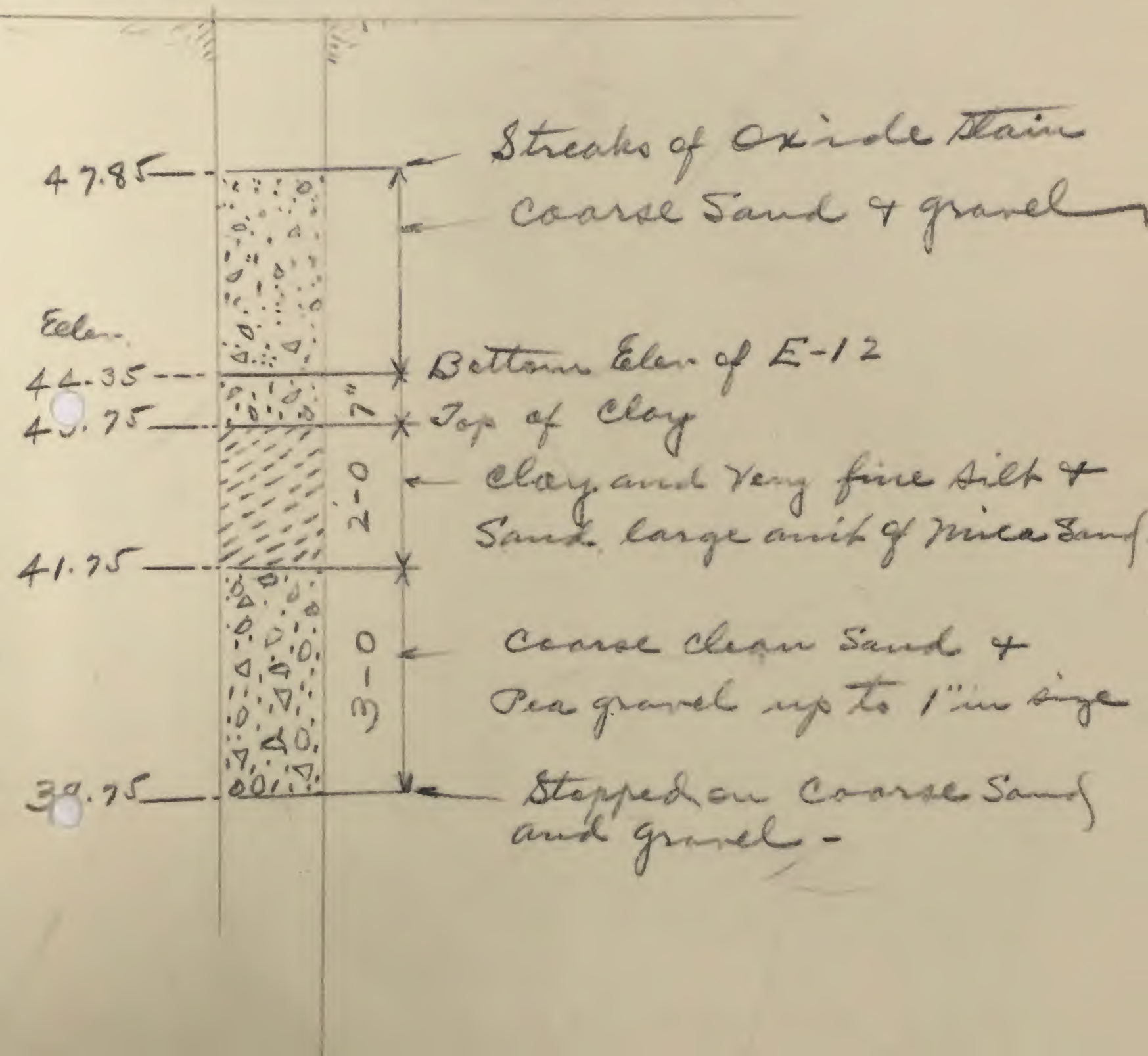
51.27- Blush gray clay.

4-0 Coarse Sand and pea  
gravel up to  $\frac{3}{4}$  in dia.

47.27- Bottom of E-4 Contract grade

7-8"  
39.61- Stopped on Coarse Sand and  
pea gravel

Test Hole under footing E-12-  
 Footing E-12 - Test Hole in Center  
 Contract Elevation 44-35

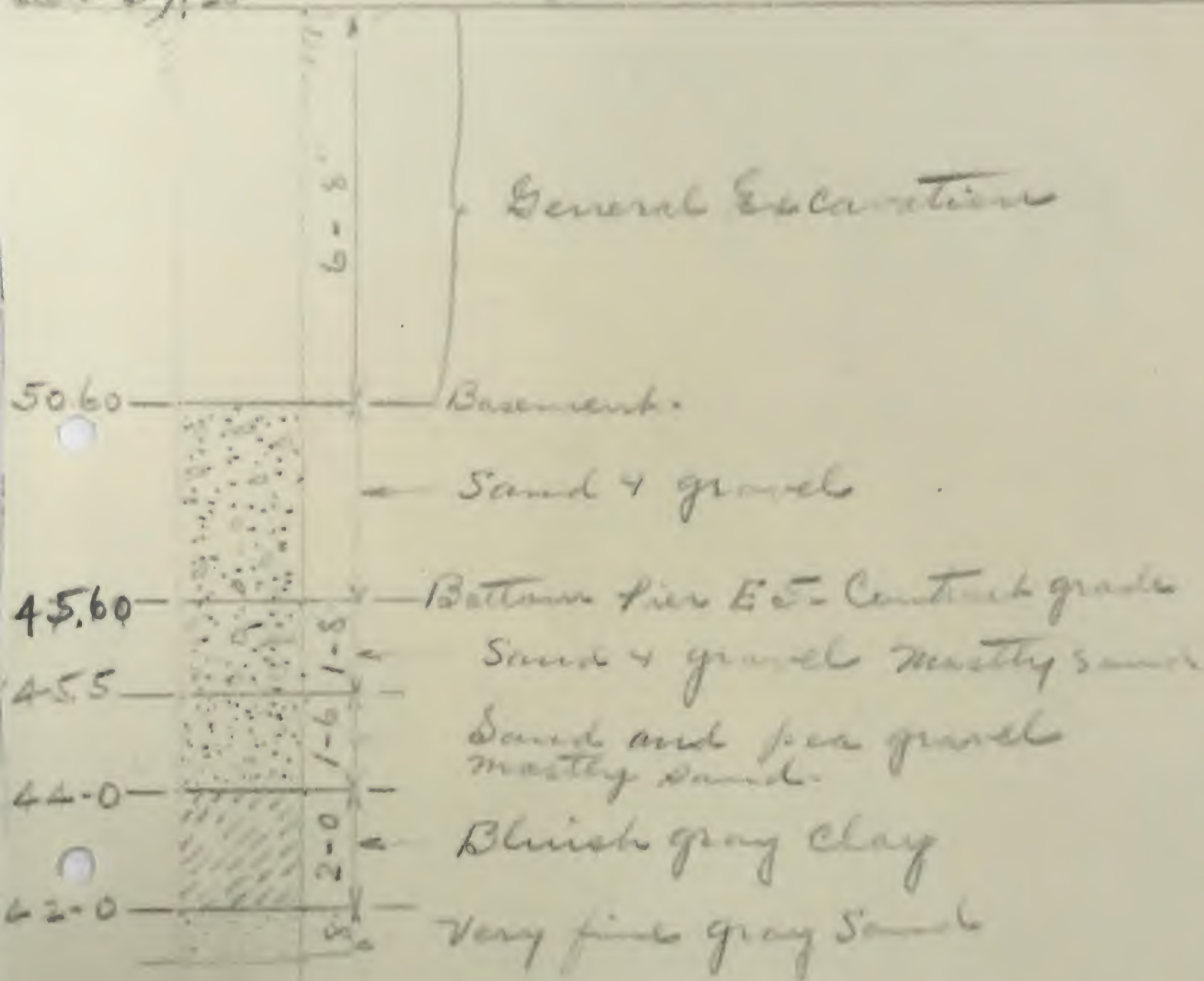




Test Hole No 3 - U.S. Mint, Denver, Colo.

Location - center of Pier E 5 -

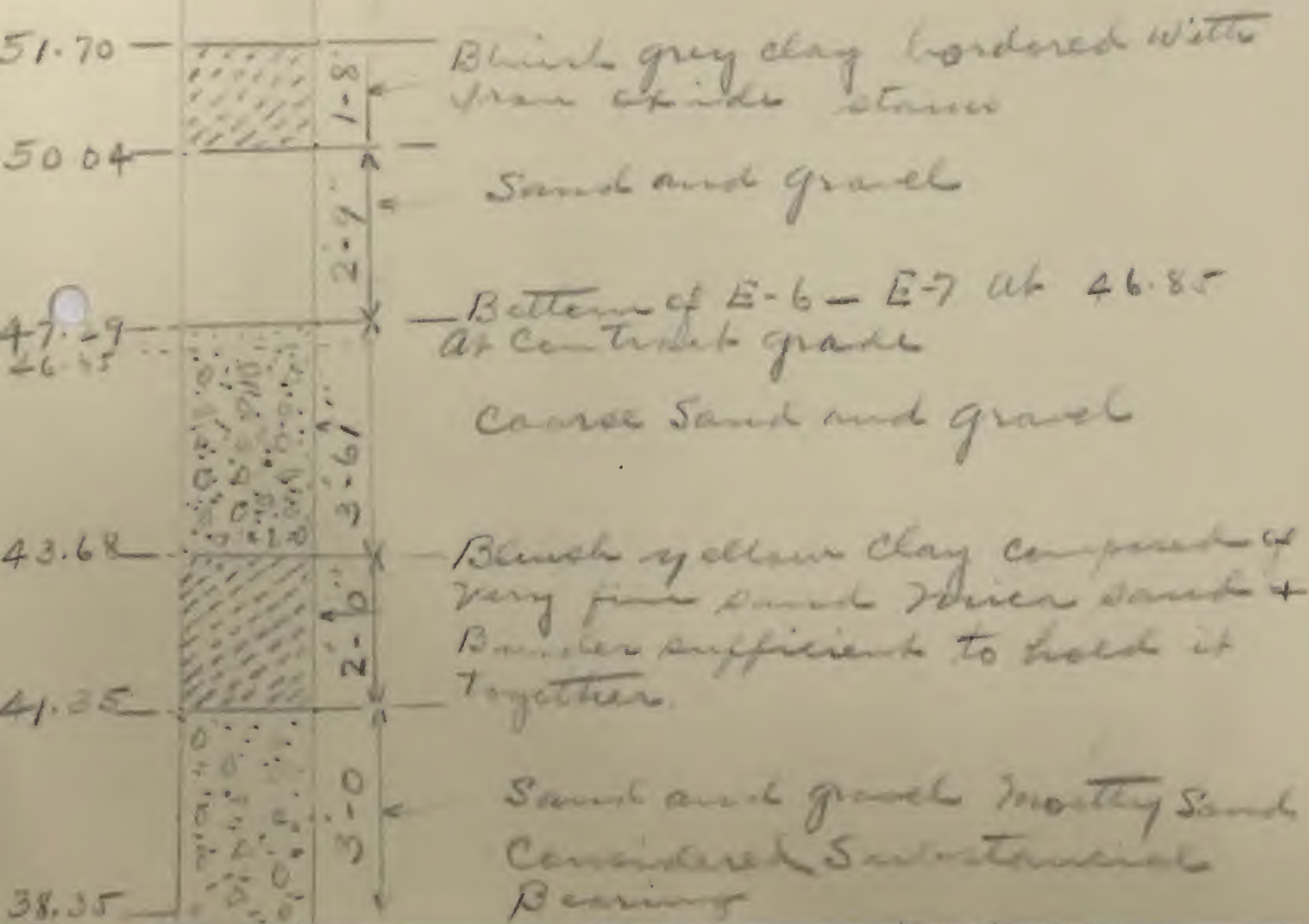
Elev. 57.25



Test Hole No 4 - Located midway  
between piers - E 6 - & 7 - U.S. Trust  
Addition Denver Colo.

Elev. 61'-0"

General Excavation



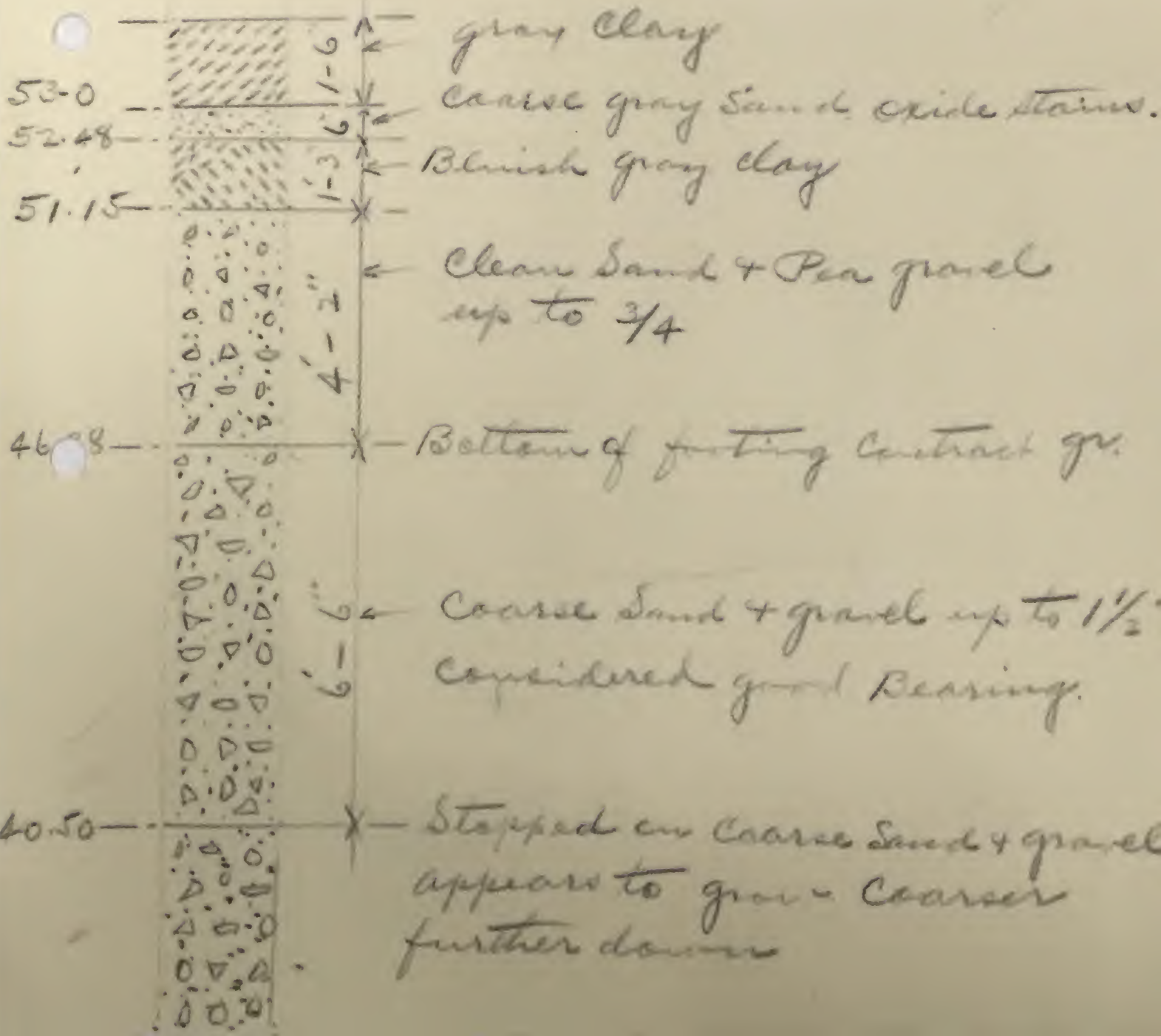


# Test Hole # 5- Joint Addition

## Placed center Pier # E-3-

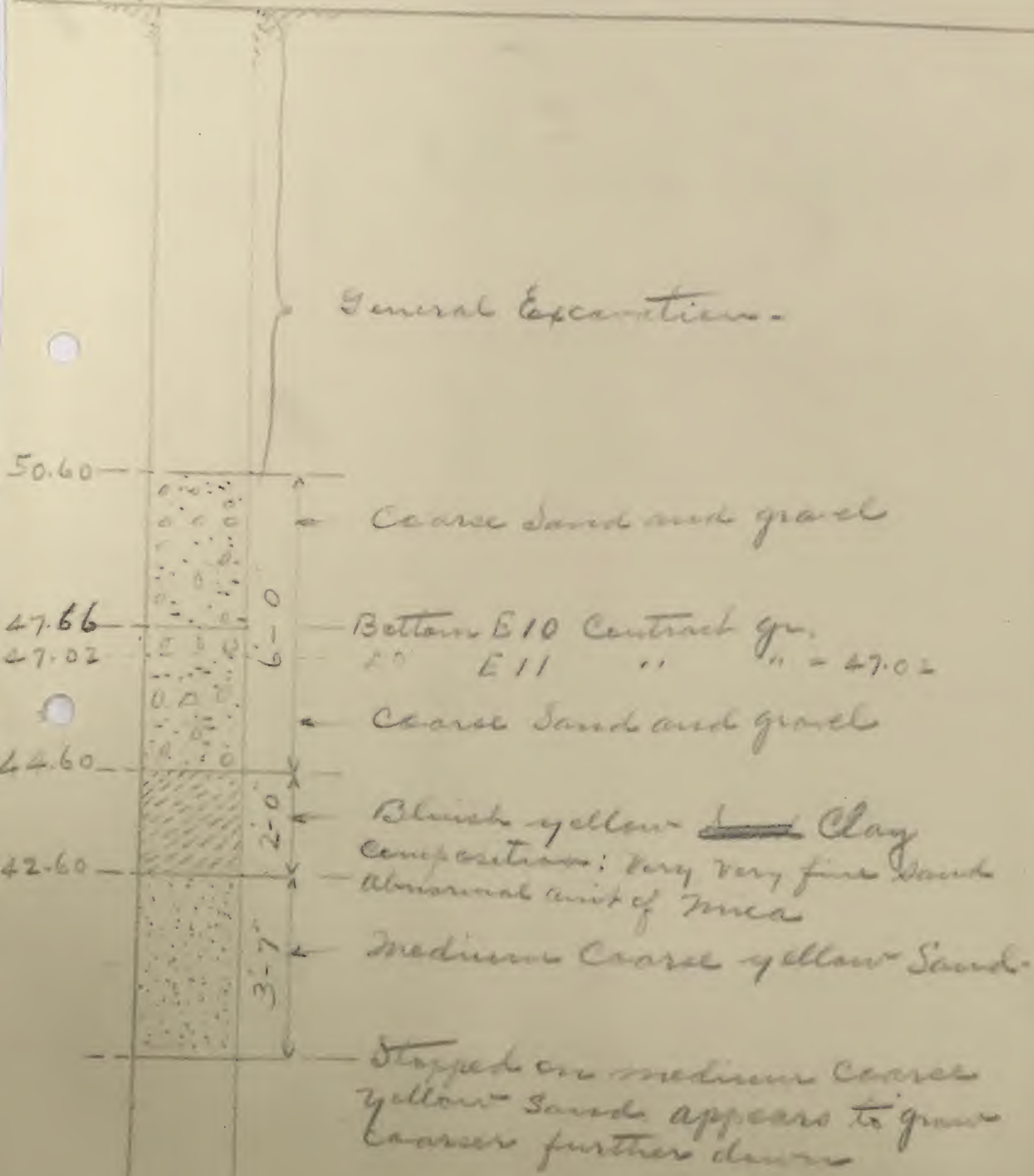
Elev 61.02

Top Soil and Loam



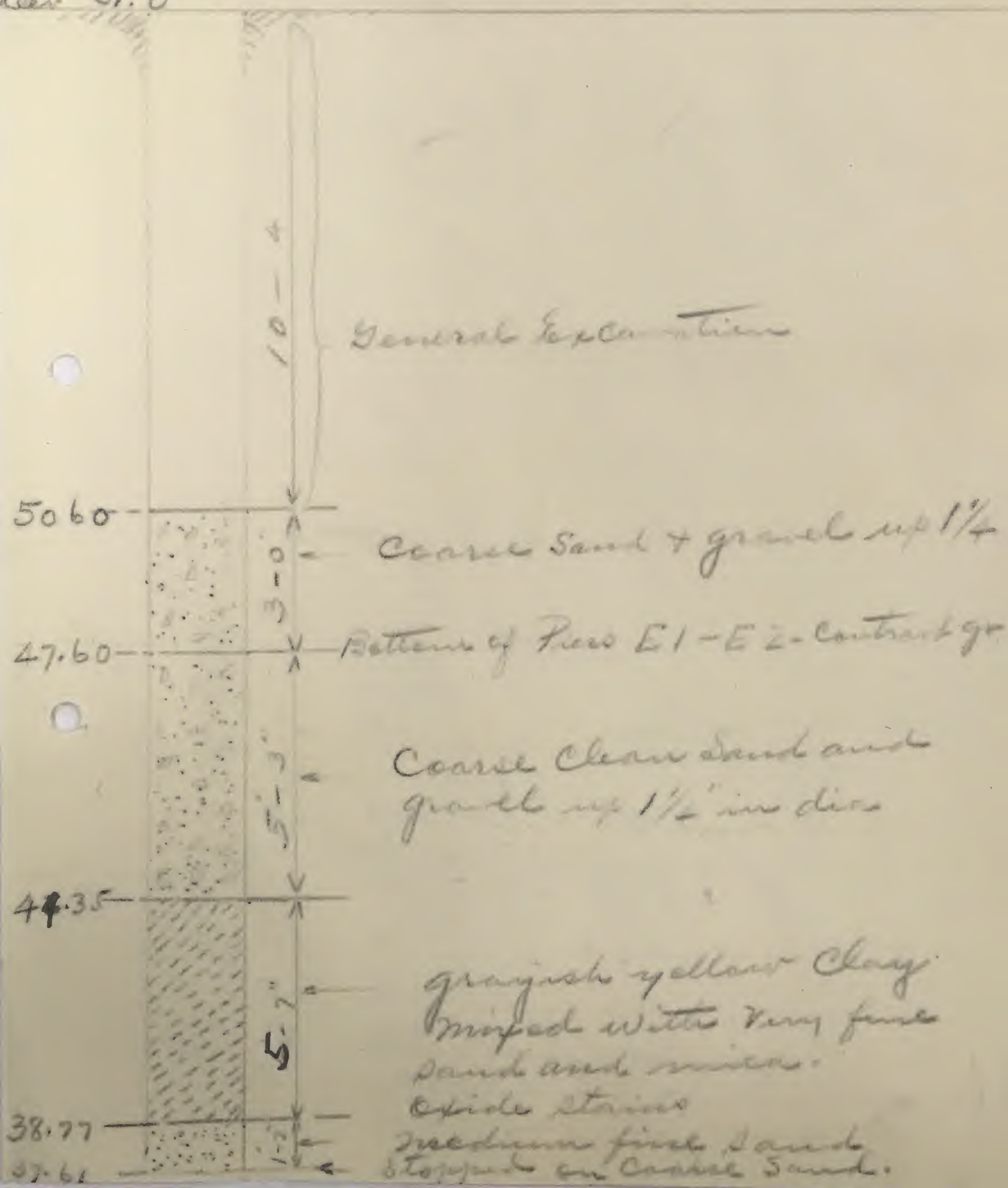
Test Hole # 6 - 71 S Mint, Denver Colo.  
Location of hole midway between 10 & 11

Recon. 61.0





Test Hole # 8- U S Mount, Denver Colo.  
Location - 2.6" S. E from S.E. Corner Pier E 2  
Elev 61.0'



Test hole No-9- With Addition  
Hole located Center Denver, Colo-  
pier E-4.

Elev 57.15.

} Formation about the same  
as test hole # 5 under pier  
E-3-

51.27

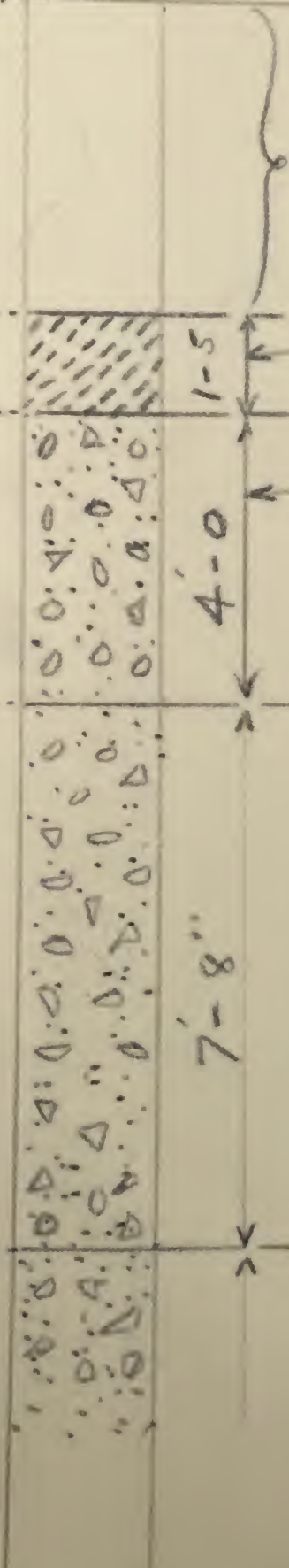
Bluish gray Clay.

47.27

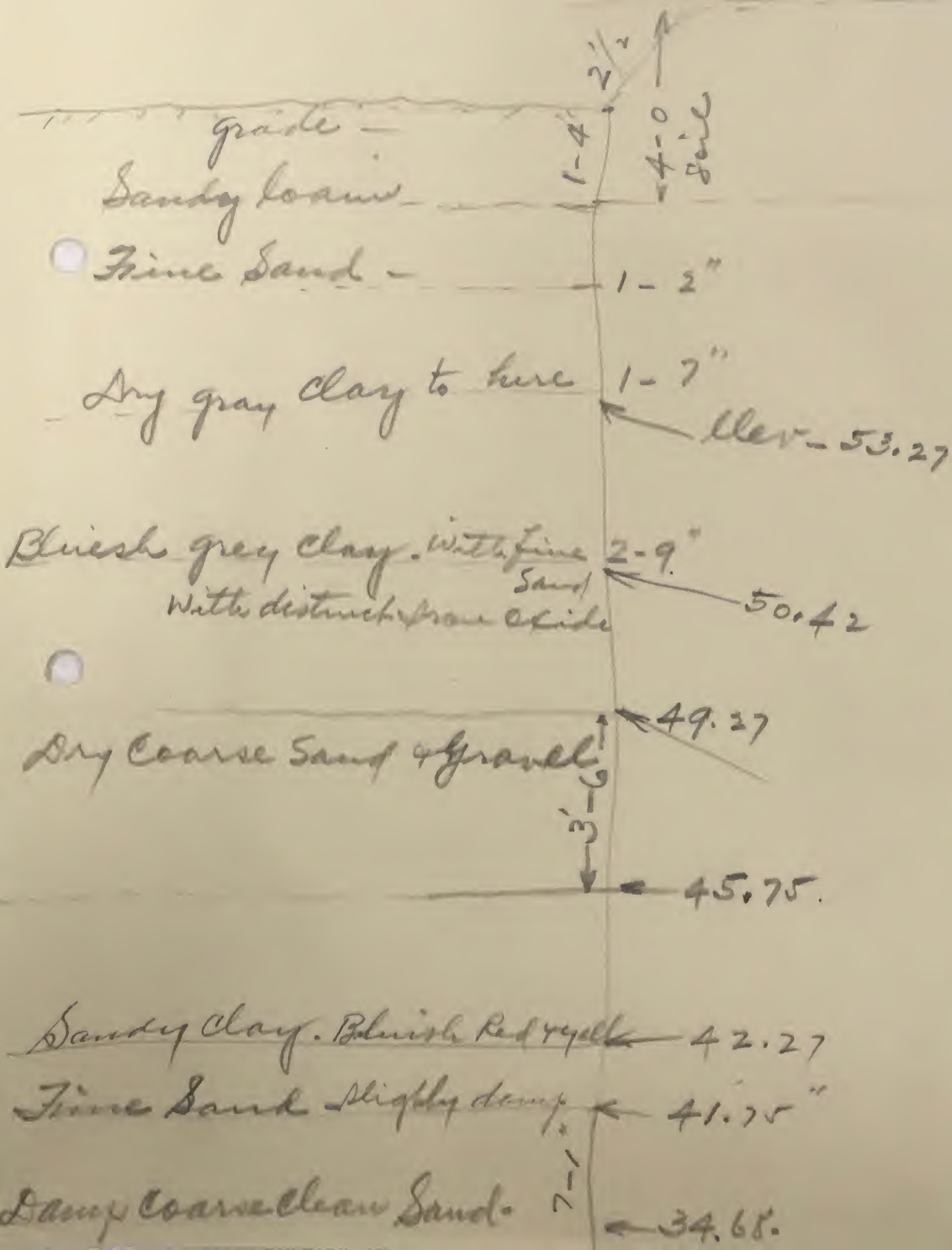
Bottom of E-4 Contract grade

39.61

Stopped on coarse sand and  
pea gravel







Enclosure No. #28282

Denver, Colorado Mint.

SUBJECT: DATA DESIRED IN CONNECTION  
WITH FOUNDATIONS, ETC.



TREASURY DEPARTMENT

WASHINGTON

RECEIVED

SEP 6 - 1935

CHIEF CLERK,  
U. S. MINT AT DENVER

PROCUREMENT DIVISION  
PUBLIC WORKS BRANCH

IN REPLYING QUOTE THE ABOVE SUB-  
JECT, BUILDING, AND THESE LETTERS

PW- S A-S

September 4, 1935.

ENCLOSURE #28282

~~Respected,~~  
Superintendent of Mint,  
Denver, Colorado.

SIR:

THERE IS ENCLOSED HERewith A CIRCULAR LETTER RELATIVE TO  
CERTAIN DATA DESIRED IN CONNECTION WITH THE FOUNDATIONS FOR THE  
Denver, Colorado Mint,  
BUILDING/TO BE ERECTED UPON THE SITE IN YOUR CUSTODY, AND AS THIS  
MATTER IS IMPORTANT, THIS OFFICE WILL BE GREATLY OBLIGED IF YOU  
WILL BRING IT TO THE ATTENTION OF THE CONSTRUCTION ENGINEER  
IMMEDIATELY UPON HIS ARRIVAL AT THE BUILDING, WITH THE REQUEST  
THAT HE PREPARE AND FORWARD THE ABOVE-MENTIONED DATA AT THE  
EARLIEST DATE POSSIBLE.

BY DIRECTION OF THE SUPERVISING ENGINEER.

RESPECTFULLY,

SUPERINTENDENT,  
STRUCTURAL-ENGINEERING SECTION.

cc: District Engineer.

Enclosures:

Repts. by Construction Engineer Culbertson, 11/19/34.

Memo. re reinf. certifs.

Blueprint typ. arrangement of test load.



MEMORANDUM RELATIVE TO FOUNDATIONS

Sir: .

For the information of this office you are directed to furnish the following data concerning the foundations of building under your charge.

1. - Give description of soil through which excavation was made, to elevation of bottom of exterior wall footings, giving nature for each foot of depth at corners of building and at intermediate points if soil varies greatly between the corners.

2. - Give detailed description of soil in which footings, both exterior and interior are to be placed; and include statements as to whether soil at that level varies under different portions of the building. Unless soil is entirely satisfactory, samples should be at once forwarded to this office.

3. - Samples of earth should always be forwarded in hermetically sealed cans (no glass jars) of about 1-quart capacity, in as nearly as possible the natural condition as regards moisture and consistency.

4. - Give any other conditions not included in above statements, which may be of value to this office. Unless evidence at hand furnishes assurance that soil under the footings is satisfactory, authority should be obtained to make test borings (additional to those required by the contract) before placing footings.

5. - State if ground or seepage water was encountered in the excavation, its amount and its probable effect upon the bearing value of the soil. Inquire of the proper city officials relative variations with seasons. Also investigate wells on adjacent sites as to elevation of surface of water and its variation with the seasons.

6. - If frost is a factor in foundation work, in the locality of the building in question, state average depth below surface of ground to which influence of frost is felt.

7. - In connection with the above questions your attention is called to the abstract copy of the Engineer's report herewith transmitted, in accordance with which the footings were designed and you are requested to comment upon such portions of this report as have not been previously covered.

8. - State the conditions of masonry buildings in the vicinity noting whether any cracks or other evidences of faulty foundations are apparent.

9. - If adjacent buildings have basements, report the elevation of their basement floors, relative to that of the proposed Government Building. Also, state whether or not the owners or occupants of these buildings have been troubled with water getting into their basement, and if not, state what if any precautions were taken to guard against same in the construction of the building.

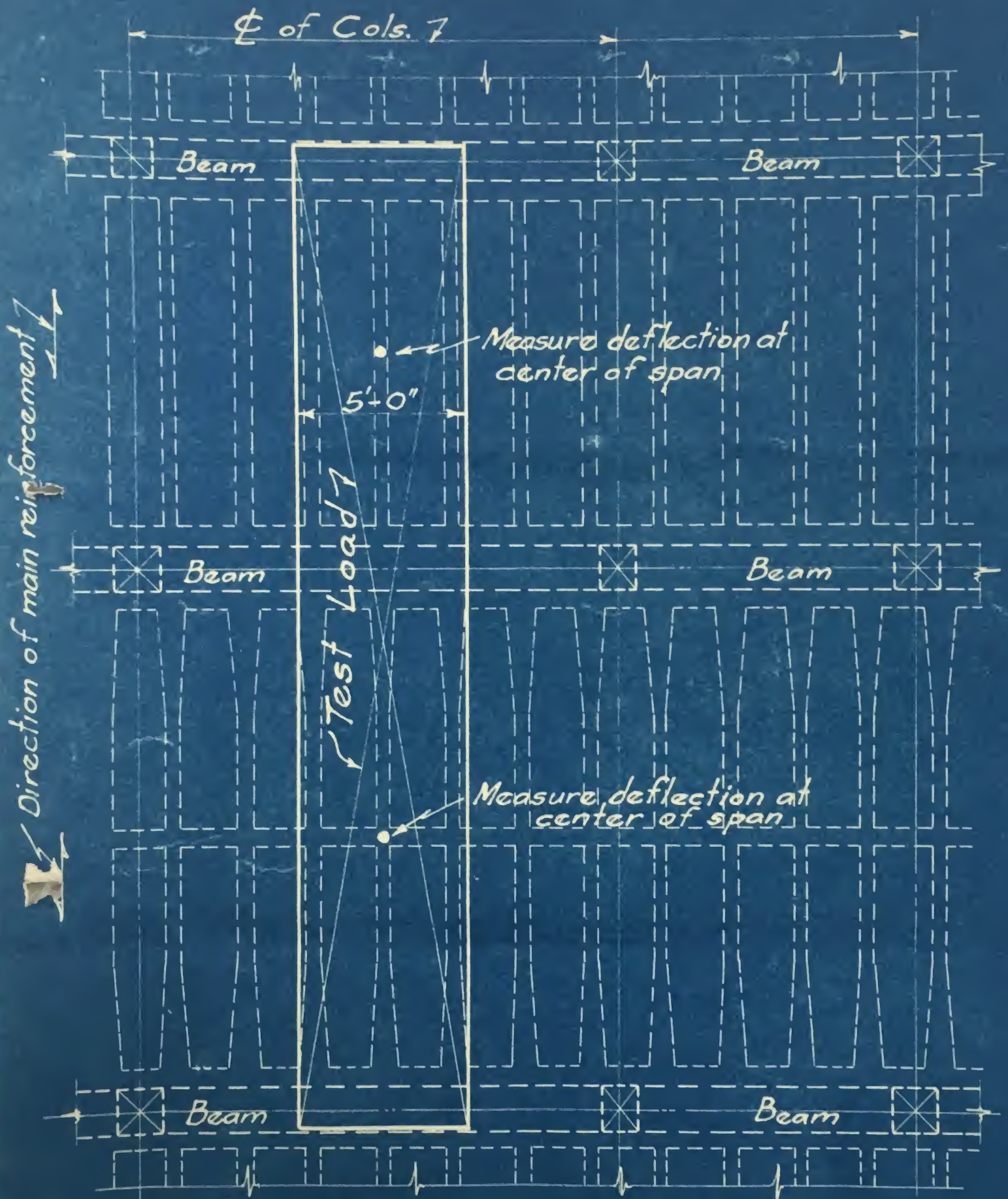
The above required information should be submitted to the Procurement Division, Public Works Branch, Office of Supervising Engineer (carbon copy to District Engineer) upon the completion of the general excavation. In case evidence of soil conditions unsuited to the designed pressure is disclosed, as much information as is then available shall be immediately submitted to the Supervising Engineer, together with definite recommendations for changes in the foundation design to meet the unexpected condition, and if practical, a proposal from the contractor covering the changes.

Footings designed  
for a pressure of 5000#  
per square foot.

Respectfully

~~CONFIDENTIAL~~ Neal A. Melick.  
Supervising Engineer.





TYPICAL ARRANGEMENT OF  
TEST LOAD \*

\*(Note: To be used when applicable)



Evans' and Elbert's Subdivision of Block 10 in Evans' Addition and Block 10 in Witter's 1<sup>ST</sup> Addition both of the City of Denver.

W. Colfax Ave.

St.

St.

N

Scale  
1 in. = 80'

Jan. 25, 1935

Delaware

Cherokee

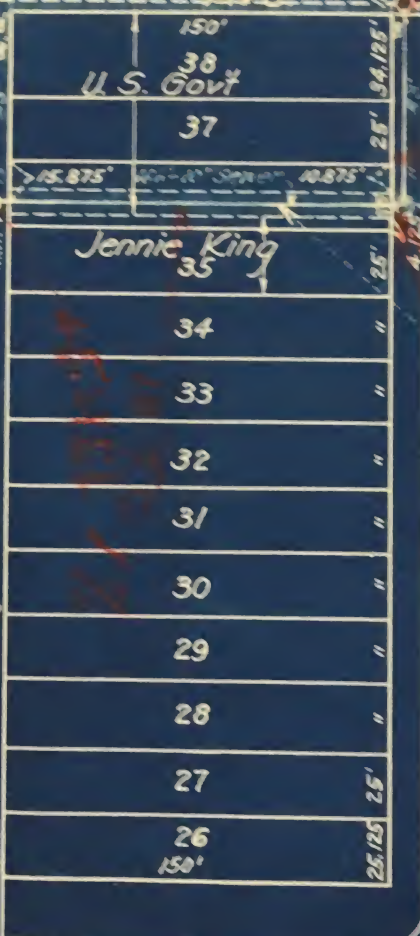
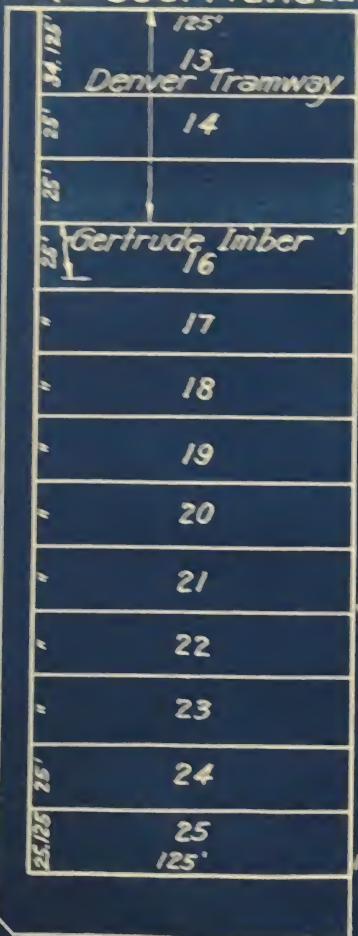
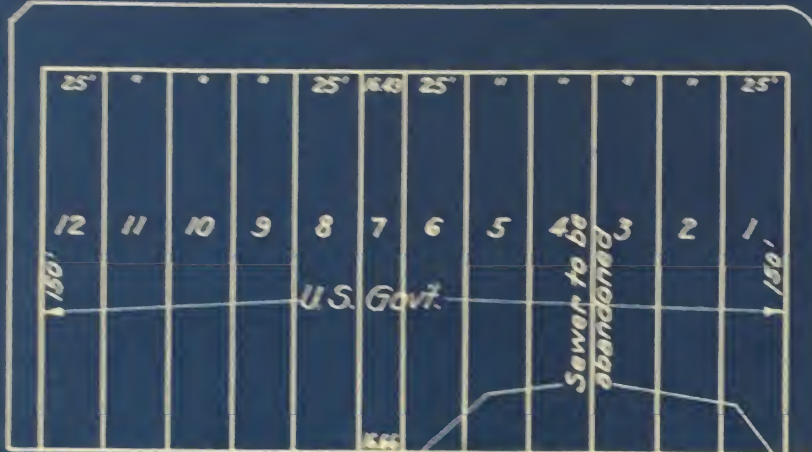
80'  
36'

W.

14<sup>th</sup>

Ave.

80'  
48'





Wm. J. Culbertson

United States Mint,  
Denver, Colorado  
November 19, 1934

Procurement Division  
Public Works Branch  
Federal Warehouse  
Washington, D. C.

Attention: Supervising Engineer.

Sir:

Pursuant to your instructions as set forth in office letter of October 16, 1934, File PW-SE., I have completed a soil investigation, topographical survey, and survey plat of the Denver Mint, (old site and proposed new addition), and herewith respectfully submit a report in triplicate of this work - all in accordance with the specifications governing topographical survey and soil investigation of sites for Federal Buildings, dated September, 1934.

The following papers and packages are herewith respectfully transmitted and made a part of this report:

1. Survey plat tracing enclosed in mailing tube under separate cover.
2. Six photographs of Denver Mint Site and Addition.
3. One aerial photographic map of district around Denver Mint Site.
4. Four photographs of foundations and excavations of Mt. States Telephone & Telegraph Co. Building at 14th & Curtis Streets.
5. Transcript of Municipal regulations governing curbs, sidewalks, streets, building code, electric wiring code, gas piping, (Public Service Company Code), boiler and elevator code, plumbing code and water service code.
6. One wood box containing eleven soil samples, (sealed cans) expressed to your office November 22, under Government Bill of Lading No. T-238858, the original and yellow copy of which are enclosed herewith.

File - J. L.  
12/12/34



Denver, Colorado Mint, November 19, 1934  
Report on Survey and Soil Investigation Continued.

7. Three bound sets of blue prints as follows:  
Set A-Mountain States Telephone & Telegraph Building drawings-4 sheets.  
Set B-Denver City & County Building drawings-4 sheets.  
Set C-Various Company and City drawings of layouts covering electric conduit, telephone conduit, watermains, overhead electric lines, sanitary sewer, storm sewer, tramway sub-station site, and miscellaneous City plats; 12 blueprints in all pertaining to the Mint district.
8. Denver Mint Preliminary Excavation and Test Pit drawing dated August 27, 1897, enclosed with above mentioned Office letter and returned herewith.
9. Various letters, tabulation and reports relative to ground water conditions, including "log of strata encountered in drilling Denver Mint Artesian Well".
10. Six vouchers together with receipts covering expenditures incurred in survey site, concrete monument, digging test pit, photographs, stenographic assistance, etc., as authorized in your above mentioned office letter of October 16th.

This report is separated into three general headings as follows: Survey of Site, Soil Investigation, and Itemized Expense of Investigation. The various subjects covered by the above mentioned general headings will be discussed in the sequence in which they appear in the specifications. The report follows:

### SURVEY OF SITE

VERIFICATION VENDER'S LAND DESCRIPTION (Par. #6). Reference is made to the vender's description of the land to be conveyed to the Government by the Denver Publishing Company, By: M. S. Riblett, President, 1712 Welton Street, Denver, Colorado, dated Oct. 16, 1934.

The above description has no doubt been carried through from the original abstract and should therefore be legally correct. However, I wish to point out two slight variations from this description found to exist in the actual measured dimensions of the plot in question.

First, due to the over-run of the block length, the actual East boundary of the Denver Mint Site was found to be 150.11 ft. instead of 150 ft. even, thus making the point of beginning of vender's description 166.11 ft. South of intersection of Southerly side of West Colfax Avenue and the Westerly side of Evans Street (now Cherokee Street) instead of the 166 ft. even dimension specified.

For the same reason (over-run of block length) the total width of lots Nos. 37 and 38 was found to be increased a distance of .025 thus making the East boundary and the West boundary of vender's plot 80.025 ft. instead of the 80 ft. even, distance noted in the description.



Denver, Colorado Mint, November 19, 1934  
Report on Survey and Soil Investigation Continued.

SITE MONUMENTS (Par. #8). All corners of Mint Site Addition are marked by concrete monuments 6"x6"x36" except the Northwest corner which has a 6"x6"x33" monument. This monument was shortened on account of interference with footings of granite wall at rear of Mint.

LANDMARKS (Par. #11). The Northwest and Southwest granite corners of the Denver City & County Building were selected as landmarks for reference. On account of the peculiar design of this corner, the middle point of the three-point corner at ground level was used for the location work. This mid-corner point is not in direct view of an instrument placed at either Site Addition corner but may be located by use of a plumb bob hung over same.

POSITION (Par. #13). True bearings of lines given on the plat were calculated from true North observations made by the City Engineering Department.

ENCROACHMENTS (Par. #14). All Site Encroachments are plainly indicated on the plat.

Your attention is especially directed to Encroachment No. A (see plat) which consists of a 15" Vit. Clay Sanitary Sewer now serving the entire Denver City & County Building and two connections from the Mint, (the waste from the Coiner's & Refinery Sump Tanks and a Refinery waste pipe). This 15" sewer is located in the alley (Courtland Ave.) a portion of which will be vacated by the City for eventual Government use and ownership. As a matter of information, I was informed by City Officials that as a condition in the vacation of said portion of the alley, the City would require an easement for the reinstallation of this sewer across the South end of the Mint Site Addition. I did not solicit this information which deals with subjects outside of my province.

Encroachment No. B consists of poles, guys, and electrical cables, now located in the portion of the alley which will be eventually vacated for Government ownership. Officials of the Public Service Company of Colorado expressed their willingness to remove these features together with the street lamp and pole located in the parking East of the Mint Site Addition.

Encroachment No. C which consists of the overhanging branches of a cottonwood tree located on property South of Mint Site Addition, appears to the writer to be an asset rather than a detriment to the Government property. This tree is a large one, in a healthy condition, and shapely in appearance.

Encroachment No. D which consists of two overhead guys and two overhead telephone wires on the West side of the present Mint Site are unsightly and should be removed.



Denver, Colorado Mint, November 19, 1934  
Report on Survey and Soil Investigation Continued.

PIPES, ETC. - RIGHT-OF-WAYS (Par. #24). Public Service Company of Colorado poles, guys, and electric cables, located in Courtland Ave. Alley, Encroachment B, are permitted by rights accruing to said Company from franchise granted by the City and County of Denver.

The 15" Vit. Clay Sanitary Sewer in the Courtland Ave. Alley is permitted by right of ownership of said alley by the City and County of Denver.

SEWERS (Par. #29). All sewers, (storm and sanitary) which are shown on the plat are "Public Sewers".

WELL WATER (Par. #36). Following this page is a tabulation of data prepared by the Water Department of the City & County of Denver covering 15 of the most important Artesian Wells in the Denver Artesian Basin.

The quality of the water from these wells is good and in most cases this well water is used to supply all needs of the building or institution, including drinking water.

Cistern water is not used for either drinking or domestic purposes.

As previously noted, various letters and reports pertaining to the subject of artesian wells in the district are enclosed with this report.

CONTEMPLATED FACILITIES (Par. #37). There are no proposed or contemplated improvements adjacent to the Site.

SEWAGE DISPOSAL DRY WELLS (Par. #38). Both the sanitary sewer and the storm sewer discharge directly, without treatment, into the Platte River at the North end of the City approximately 3½ miles North of the Mint. However, the City is contemplating the installation of a treating plant for the sanitary sewage.

Water from sub-soil drainage systems including floor drains is not permitted in the sanitary sewers but must be discharged into the storm sewer system.

Dry wells and cesspools are not used for either sanitary or rainwater disposal purposes.

PRIVATE SEWER (Par. #39). All sewers adjacent to the Mint are for public use without charge.

SEALING COST (Par. #40). This question has been answered in previous paragraph.



Denver, Colorado Mint, November 19, 1934  
Report on Survey and Soil Investigation Continued.

TABULATION COMPILED BY DENVER MUNICIPAL WATER WORKS COVERING  
DATA ON PRESENT CONDITION OF ARTESIAN WELLS IN DENVER ARTESIAN BASIN

NAME	DEPTH OF WELL	TO WATER	CASING INCHES	DATE DRILLED	PERIOD OF SERVICE	PUMPING DEVICE	PRESSURE	QUANTITY RATE	TIME EACH DAY	REMARKS
Mack Bldg. 16th & California	621'		5-5/8" & 4 1/2"	1890	44	100#	air	30 gal.min.	12 to 13 hrs.	Stayed about the same during last 15 or 20 years.
Mint W.Colfax & Cherokee	735'	320'	12" to 4"	1904	30	110#	"	20 " "	8 "	
Swift & Co. Stockyards	1380'	250'-	to 600'					400 " "		78° F. escaping water helped Armour's well draw down 139'.
Daniels & Fisher 16th & Lawrence	800'	260'	6-5/8"	1884	50			23 " "	12 to 14 hrs.	Original 75' head (1884) 1890 pumping well
Gas & Electric Bldg. 15th & Champa	661'	290'	to bottom	1909	25			50 " "	10 to 12 hrs.	Dropping slightly.
Denver Dry Goods Co. 16th & California	723'		8" to 4 1/2"	1906	28			80 to 100 gal. "	14 hrs.	
Tabor Bldg. 16th & Curtis	606'		4 1/2" to 2 1/2"	1900	34	135# st.air 125# working		85,000 gal.	12 hrs. day	Water table has dropped.
Brown Palace #1 17th & Tremont	700'	260'	8-5/8"	1904	30	140#	air	50,000 "	" 14 hrs.	
Brown Palace #2 18th & Broadway	700'	260'	8-5/8"	1904	30	140#	"	50,000 "	" 14 hrs.	
Clayton College 33rd & Jackson	750'		8"	1912	22	110#	"	40 gal. min.	14 hrs.	
Fitzsimmons Gen'l Hosp. Aurora	927'	230'	12" to 5"	1930	4			75 " "	18 to 24 hrs.	120' drawdown at 75 gal. per min.
Columbine Laundry 20th & Washington	755'	318'	Yes	1912	22	Pomona		90 " "	18 hrs.	Water level dropped from 276' to 318'.
Home of Good Shepherd Colo. Blvd. & Louisiana	1000'	250'	Yes			160# st. air 120# run		65 to 70,000 gal. day	12 hrs.	2 wells - affected well at St. Thomas Seminary
Continental Oil Co., Brighton Road	504'	40'	Yes	1924	10			Sml.Domestic		Originally flowed but fell off as wells were drilled nearby.
								Sml.Domestic		Few flowing wells but flow is decreasing.
Brighton, Brighton	350'	Av.18'	Yes	1890 to present hand						



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CITY REGULATION (Par. #41). A transcript or printed copy of the various municipal regulations and codes as outlined in a previous paragraph are mailed under separate cover.

### REPORT ON SOIL INVESTIGATION

TEST PIT AND BORING (Par. #44). One test pit 4 ft. wide by 6 ft. long was dug in the Southwest corner area of the Mint Site Addition and a test boring made in the bottom of this hole. The test pit proper was dug to a depth of 23'-11" below ground and the boring at the bottom extended an additional 3'-11" to the ground water level or a total depth of 27'-10" below ground surface. For the exact location of this pit and log of strata encountered see plat. From this log you will note that the elevation of the top of the lower sand strata, namely, 42.27 checks almost exactly the elevation of this same strata which appears in test pits Nos. "C" and No. 5 as recorded on old Mint drawing entitled "Preliminary Excavations and Test Pits-Denver Mint" dated August 27, 1897, copy of which is enclosed herewith. In view of the close check of the findings as revealed by the writer's pit with the results obtained from the nine pits which were dug on the present old Mint Site, further exploration of the Mint Site Addition area was not deemed necessary.

DESCRIPTION OF THE SOIL (Par. #50). The top soil overlying the site in front of the Publishing Company building was found to have a total thickness of 4'-0". (The grassed or lawn area in this portion of the Site (front) is terraced or elevated approximately 2½' above the sidewalk and alley). The top 3'-8" of this strata is composed of a black loam, with a small percentage of foreign matter and rocks in it. The safe bearing value of this material is estimated at 1200#/ sq. ft. The lower 1'-4" layer of this top soil strata consisted of a light colored sandy loam, the sand content of which being estimated at around 5%. The safe bearing value of this material <sup>was</sup> estimated at around 1600#/ sq. ft. All of the top soil strata found to be in a dry state.

The first strata under this top soil was composed of a moderately fine sand in a dry state and approximately 1'-2" in thickness. In this dry condition, this material considered alone should safely sustain a load of approximately 4000#/ sq.ft.

The next lower strata below the sand was found to be a dry, grey clay, 1'-7" in thickness extending down to elevation 53.27. In this dry state this clay should have a safe bearing value of 4000#/ sq.ft. However, with lawn irrigation it is not apt to remain in the dry state and I therefore feel the above value should be reduced to 2000#/ sq. ft.

The next strata encountered was found to be a bluish



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grey clay, 2'-9" thick, interspersed with pockets of fine sand. The borders of these fine sand pockets were composed of a clay showing a distinct iron oxide stain, ranging in color from an orange to a dark brown. This clay was slightly damp. Again, I do not believe that the safe bearing value of this material should be placed higher than 2000#/ sq. ft.

A gravel strata 1'-3" thick was encountered just below the clay. This gravel layer contained occasional clay pockets and patches of iron oxide stain, these stained streaks varying in color from orange and yellow to a brown. On account of the presence of the clay pockets in the gravel, I would not recommend a soil pressure greater than 2000#/ sq. ft. for this material.

The next strata encountered at elevation 49.27 ft. was composed of a dry, coarse sand and gravel 3'-6" thick, mostly sand on the West side of the pit, gradually changing to a gravel on the East side of the pit, with occasional iron oxide stained streaks. The material of this strata, considered alone, should be capable of safely sustaining 5000#/ sq. ft.

The strata next encountered was found to be sandy clay, bluish red and yellow in color and 3'-6" thick extending down to elevation 42.27 ft. This clay was damp to the touch and had a sand content estimated at 10%. In a wet condition which may easily obtain during certain portions of the year the safe bearing value of this material is estimated at 2000#/ sq. ft.

Beginning at elevation 42.27 ft. a thin strata of fine sand was encountered, having a thickness of 6" and slightly damp. While this material was moderately fine in texture, it was not a flour sand of the quicksand variety. The safe bearing value of this material is estimated at 3000#/ sq. ft.

The next lower strata was composed of a damp, coarse, clean sand 7'-1" thick, extending down to elevation 34.68. I believe this material will provide a highly satisfactory foundation bed for the Mint Annex building footings and I respectfully recommend that the footings be extended down into this strata. I believe a conservative estimate of the safe bearing value of this material to be 5000#/ sq. ft. Local architects use a value of 6000#/ sq.ft. for this same material for the design of commercial buildings and structures.

Between elevation 34.68 and elevation 33.18, the top of the ground water surface, I found the same above described damp, clean, coarse sand with the addition of "fist sized" rocks. The presence of these rocks made boring operations very difficult. It is my belief that this material continues down without interruption to bed rock approximate elevation 16.0, or a distance of approximately 17 ft. below ground water level. The estimated safe bearing



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value of this coarse sand and gravel is placed at 5000#/ sq. ft.

For your further information relative to strata below the limits of the test pit boring, I am enclosing a copy of the drill-er's log for the Mint Artesian Well. (See plat for location). This record lists strata on down to the 700 ft. level.

You will note from the above discussion of the various strata which have been treated individually, that down to elevation 42.27, there is quite a variation and range in the soil composition and that below this level there is a marked decrease in this variation and greater uniformity. It is apparent that this portion of the City which includes the Mint, was at one time an old river bed, (Platte River) and being such, it is the writer's thought that further test pit or boring operations made in different locations on the Site would reveal marked variations in the log of strata down to elevation 42.27, and that below this level the records would appear approximately identical. This conclusion is borne out by the test pit logs of the old or present Mint Site as recorded in the Test Pit blueprint dated August 27, 1897. Again, these thin clay strata appearing in the walls of the test pit above elevation 42.27 varied in thickness on different sides of the pit, thus indicating the possibility of their "pinching" out and their limited extent.

With these facts in mind, I believe it highly desirable to penetrate through these layers of uncertain varying strata and select the coarse sand at or below elevation 41.00 as the bearing material for the building foundation. Investigation has definitely proven strata below this elevation to be approximately uniform in extent and quality.

GROUND WATER (Par. #51). The elevation of the ground water as found in the pit is 33.18 ft. The elevation of the flow line of Cherry Creek at a point where a perpendicular to the Creek passes through the Mint (between 13th and 14th Ave.) is 34.10 ft. This point is approximately 1450 ft. from the Mint. Thus it is apparent that the flow is from Cherry Creek towards the Mint; the minimum drop between the stream bed of the one, and the ground water table of the other being .92 ft. this drop increasing with increased depth of water in the creek. This is one controlling factor in the height of the ground water at the Mint. The other controlling factor is the Platte River, which is no doubt the outlet for at least a portion on the ground water flow. Evidence disclosed by observations on the fluctuation of water surface in pump wells and pumping operations in deep open excavations discloses the fact that there is practically no variation in the elevation of the ground water surface during the year or year to year. The only noticeable change in this ground water surface has been brought about by the installation of more pump wells and greater use of it by pumping, which has a natural tendency to lower the general level.



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I was informed by the contractor who excavated the basement of the Mt. States Telephone & Telegraph Company building at 14th & Curtis Streets, that throughout the year that this pit was opened up, the quantity of water pumped remained practically uniform. This excavation was approximately 47 ft. below the curb in the deepest portion, ground water being encountered at approximately 23 ft. below the curb. The City elevation of this curb is 45.0 ft. Two 2½" pumps and one 3" pump operating against a 40 ft. head and running continuously, were required to keep the excavation dry.

The effect of the ground water on the clay strata would be a pronounced decrease in the safe bearing capacity between the dry and wet states. The effect of this water on gravels and coarse sands (not quicksands) would be slight as long as these strata remained confined.

ROCK (Par. #52). The depth to bedrock at the Mint Site as recorded in the Artisian Well Driller's log, (copy of which is attached hereto) is approximately 40 feet below ground, or at elevation 16.00 ft. At the Mt. States Telephone & Telegraph Co. Building rock described as a volcanic rock or so-called blue shale was encountered at a depth of 23'-6" below the curb or elevation 21.5 ft.

Quicksand has never been encountered in the vicinity of the Mint.

FROST (Par. #53). Frost is a factor in foundation work in this locality, to the extent that building footings are extended a minimum of 4.5 or 5 feet below the surface of the ground to avoid frost action. During extremely long and cold winters, the influence of frost is felt to a maximum depth of 4.5 feet below the ground.

FRESHETS (Par. #54). Cherry Creek (See Aerial Survey Map on which it appears as a dark diagonal band running from the lower right to the upper left hand corner) is approximately 1450 ft. airline measurement from the Mint Site. The flow in this creek varies from a stream not more than 2 ft. wide and 4" deep, to a flood stage 10 ft. deep with water overflowing the concrete side walls. However, even during the worst floods, the water from the creek has never come closer than one block away from the Mint.

MINERAL RIGHTS (Par. #55). The City and County of Denver, Colorado, is not underlaid with mines, the closest mine (coal) being approximately 18 miles from the Mint Site. Property South of Colfax in the vicinity of the Mint is not subject to mineral rights.

ALKALI (Par. #56). The soil contains alkali (white) in small quantities insufficient to affect footings constructed of good quality concrete. The approved local method of guarding



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against the harmful effects of the alkali is to use only good, dense, weather-resistant concrete in the construction of the footings.

DENVER CITY & COUNTY BUILDING (Par. #57). The largest masonry building in the vicinity of the Mint Site is the Denver City & County Building, which is located across the street to the East of the Mint. This building was completed in 1929 and is a four-story structure having two basements and a clock tower. The building which is granite faced has a steel frame, reinforced concrete floors, and is of fireproof construction throughout.

The foundations of this building are of the spread footing reinforced concrete type resting on the coarse sand and gravel which appears in the Mint Site Addition test pit below elevation 41.76 ft. Test borings were made in all footing excavations to detect the presence of any stray clay pockets and, if found to be present, the excavation was continued until same were eliminated.

To provide a more detailed picture of its construction, there are enclosed four drawings (Enc. Dwg. Set B) covering various phases of design including the footings.

The elevation of the basement floor in this building is 47.17 ft., elevator pit floor 41.92 ft. and the bottom of the lowest footing 38.17. The first floor elevation this building is 64.12 ft.

The unit soil pressure used in the design of this building is 6000#/ sq. ft. No cracks or other signs of settlement have appearance in the structure since this building was completed.

The basement walls were waterproofed by an asphalt coating on their outside surface. (Membrane method not used). I am informed that the occupants of this building have not been troubled with dampness or seepage water at any season since it was completed.

MT. STATES TEL. & TEL. CO. BUILDING (Par. #57). which is located at 14th & Curtis Streets (9 blocks Northwest of the Mint) is a 15-story building with two basement floors. This building which was completed in 1929 is a Class A structure, with structural steel frame, is faced with architectural terra cotta, has reinforced concrete floors and fireproof construction throughout.

The foundation for this building was carried down into rock commonly called a blue shale but correctly termed a volcanic ash. Rock strata was penetrated a maximum distance of 23.5 ft. for the deepest building footing. The extremely deep excavation (into rock) was made necessary to provide ample basement space for



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telephone equipment. The type foundation supporting this building is reinforced concrete spread spot footings.

To facilitate a more detailed examination of the design and construction, I am enclosing herewith five blueprints (Enclosure Drawing Set A), which cover various building and foundation phases.

The elevation of the lower basement floor of this building is approximately 15.33 ft. The elevation of the bottom of the deepest footing is approximately minus 1.58 ft. City datum.

I was informed by the Mt. States Tel. & Tel. Co. Architect, Mr. R. C. Bryant, that a unit soil pressure of 6000#/ sq. ft. was used for the portion of the footings resting on coarse sand and gravel and 8000#/ sq. ft. for the portion resting on the volcanic ash rock. Mr. Bryant also informs me that cracks or other signs of foundation settlement have not appeared in building since completion.

All basement walls and floors are waterproofed by the membrane system and no trouble has been experienced from dampness or seepage water at any season of the year since occupancy.

On the following page you will find a tabulation which I have compiled covering design and construction data for various recent large buildings within a radius of nine blocks of the Mint Site.

FOUNDATIONS (Par. #58). The most suitable type of foundation for the two-story heavy masonry Mint Addition building would be a reinforced concrete spread footing designed for a uniform unit soil pressure of not to exceed 5000#/ sq. ft. over its entire area.

The footings and foundation walls of this building should be thoroughly waterproofed and provided with an adequate sub-soil drainage system, including a rock-filled area over the footings. This recommendation is made with the thought of protection from the effects of surface lawn irrigation and not for protection from ground water which will be below the probable bottom of footing grade.

In view of the fact that the Site is in an old river bed, I respectfully recommend that 10 ft. test borings be made in all footing excavations after completion, as a precautionary measure to detect the possible presence of any clay pockets, and in the event said pockets do appear, that the footing excavation be continued down to a point below said clay pockets.



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TABULATION OF DATA ON RECENT LARGE BUILDINGS.

BUILDING	LOCATION	YEAR COMPLETED	HEIGHT	TYPE CONSTRUCTION	SOIL UNDER FOOTING	UNIT SOIL PRESSURE USED
Denver City & County Building	Colfax Ave. & Cherokee St.	1929	4 Stys & Tower. 2 Bsm't. Fls.	Steel frame Reinf. concrete floors Granite faced Reinf. conc. spread footing	Coarse sand and gravel	6000 #/ sq. ft.
Mt. States Tel. & Tel. Co.	14th & Curtis	1929	15 Stys. with 2 Bsm't Fls.	Steel frame Reinf. conc. floors Arch. terra cotta faced Reinf. conc. spread foot- ings	Part volcanic ash rock and Coarse sand and gravel	8000 #/ sq. ft. 6000 #/ sq. ft.
Cosmopolitan Hotel	Broadway near 18th St.	1925	11 Stys. with 1 Bsm't.	Reinf. conc. frame and floors Brick & terra cotta face Reinf. conc. spread footings	Coarse gravel	6000 #/ sq. ft.
Continental Oil Bldg.	18th & Glenarm	1926	10 Stys. with 1 Bsm't.	Steel frame terra cotta face Reinf. conc. floors " " spread footings	Fairly coarse sand	6000 #/ sq. ft.
Sears & Roebuck Bldg.	Broadway near 17th St.	1929	2 Stors. with x Bsm't.	Reinf. conc. flat slab const. Brick & stone trim Reinf. conc. spread footings	Fine silt sand verging on quick- sand	4000 #/ sq. ft.
Denver Theater Bldg.	16th & Glenarm	1926	Equivalent to about 5 sty. bldg. in height.	Steel frame Reinf. conc. floors Brick & terra cotta trim. Reinf. conc. spread footings.	Coarse sandy gravel	6000 #/ sq. ft.

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The approximate calculated unit soil pressure under the gold vault in this Mint, loaded full capacity is 7100#/ sq. ft. The base of this vault is in the same coarse sand strata for which I recommended a 5000#/ sq. ft. loading. So far, this vault has shown no signs of settlement. However, in the redesign and construction of the proposed new silver vault in which greater soil pressures (greater than 5000#/ sq. ft.) must be assumed on account of restricted footing area and required vault capacity, I respectfully recommend that this vault structure be designed entirely independent of the building structure without mechanical ties or connections of any sort, thus permitting the one to act and perhaps settle independent of the other. The 5000#/ sq. ft. loading recommended for the Mint Annex building is a conservative figure, but in view of the nature and ultimate cost of this structure, I believe the conservatism justified.

#### TIME REQUIRED TO COMPLETE ASSIGNMENT

Time required to set concrete monuments, dig and back-fill test pit and make topographical survey and survey plat was 25 calendar days, including 3 Sundays and 2 Holidays.

Time required to collect data and write up report was 5 calendar days including one Sunday.

Total time required for the completion of the assignment was 30 calendar days including 4 Sundays and 2 Holidays. (Worked all Sundays, Holidays and 21 evenings to 10:30 P. M.)



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ITEMIZATION OF EXPENSES INCURRED

SURVEY & MONUMENT

City & County of Denver-Voucher 11/21/34 \$80.00

TEST PIT-LABOR

Andrew McConnell -Voucher 10/31/34 26.00

George M. McFadden -Voucher 10/31/34 20.00

PHOTOGRAPHS

Mile High Photo Co. -Voucher 10/31/34 10.50 ✓

King Aerial Survey Co -Voucher 10/31/34 2.00

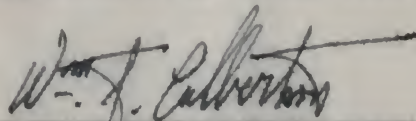
STENOGRAPHIC WORK

Mrs. A. M. Dobbins -Voucher 11/23/34 11.50

TOTAL EXPENSE INCURRED (not including my  
salary or personal expenses) \$150.00

Duplicate copies of six vouchers as listed and  
dated above, together with signed receipts for payment  
are enclosed herewith.

Respectfully submitted,



Wm. J. Culbertson  
Construction Engineer

WELL RECORDS OBTAINED BY R. W. CANDLER

No. 1      Date Nov. 19, 1934

Owner of well - U. S. Mint  
 Post-office address - Denver  
 When commenced - Jan. 2, 1904  
 When completed - Mar. 26, 1904  
 How put down - drilled  
 Size or diameter - 10-5/8, 8-1/4, 6-1/4, and 5 inch  
 Depth total - 701; to water; 190 ft.; depth of water 511 ft.  
 Does depth of water vary at different times of year? - Yes  
 Did water rise when struck - Yes  
 Does water flow over surface - No.  
 Quality of water - soft.  
 Water used for - Boilers  
 Elevation of surface - St. L.  
 Strata passed through and remarks

O=41.27

23 feet of 10-5/8  
 320 " " 8-1/4 casing bottomed 320'  
 212 " " 6 " " 525'  
 190 " " 5 " " 701'

STRATAS PASSED THROUGH.

O - 40' - Sand & gravel -  
 Their "O" = Approx. Elevation=56.00 ft. City Datum  
 40 - 41' Bed rock  
 41 - 185 Blue clay & blue shale  
 185 - 193 Hard sand rock  
 193 - 330 Clay & Shale  
 330 - 336 Water sand (1st & artesian sand)  
 336 - 342 Clay  
 342 - 354 Sand rock  
 354 - 374 Hard blue sand rock  
 374 - 383 Water Strata  
 383 - 394 Clay  
 394 - 400 Sand rock  
 400 - 404 W. S.  
 404 - 412 S. R.  
 412 - 422 Clay  
 422 - 436 S. R.  
 436 - 449 W. S.  
 449 - 462 C. & S.  
 462 - 485 S. R.  
 485 - 495 W. S.  
 495 - 505 C. & S.  
 505 - 522 W. S.  
 522 - 576 C. & S.  
 576 - 586 S. R.  
 586 - 591 C. & S.  
 591 - 592 Hard sand rock  
 592 - 612 W. S.  
 612 - 625 C. & S.  
 625 - 672 S & R  
 672 - 701 Light blue clay



14. Foundation Work - PENDING Denver Mint Job

